HEPTARCHIA MATHEMATICA,

OR,

The Seven Branches of ART here following.

EPITOMIZED, viz.

Arithmatick, *Geometry*. *Flat Measure*, *Square Measure*, } *Gauging*, *Mensuration by Tables*, *Dialling*, &c.

Being now exhibited to the View of *Artists* as well as others, in a Plain, Practicable, and Easie Method, whereby every Young *TYRO* may come to a Perfect Understanding without the help of a *TUTOR*; which for Ease and Expedition, the like not Extant in the *English* Tongue.

Being a Work very Useful for

Gentlemen, *Surveyors*, *Architects*, *Engineers*, } *Masons*, *Bricklayers*, *Carpenders*, *Joyners*, } *Glasiers*, *Painters*, *Diglers*, *Sleaters*, &c.

By *JOHN WING*, Practitioner in the *MATHEMATICKS*.

Sebtemb. 14*th.* 1689. This may be Printed,
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To that truly Learned

MERCÆNAS

The Right Honourable

JOHN

Earl of EXETER.

Right Honourable,

I *Implore Your Honours Pardon, in begging Your Patronage to these following Trifles; First, acquitting my self of that common Vice called* Flattery, *observing that* Dedications *of this Nature are too often accompanied with, which (when it is discovered) doth very much Sully and Defame them in the Judgment of Wise Men; whose Estimate of things is certainly most Valuable. I know it hath been my Infelicity not to be known to Your Honour, but how obscurely soever I have lived, I have not conversed altogether with Obscurity; neither is there any thing that so mean a Person as* I, *can either Speak or Write, should any ways draw Your Lordships Eye upon me, or what I have here done; but being assuredly satisfied of Your Admirable and Acquired Parts, by such Eminent and Learned Persons of my Acquaintance, as hath had the happiness to Converse*

with Your Lordſhip *in moſt of the Liberal* Arts *and* Sciences; *from thence have I taken my meaſures to inform my ſelf of the Generoſity of Your Temper, and Invincable Love to Your Countrey, which Excellencies (like a Star of the firſt Magnitude) ſhine moſt in ſuch Honourable Perſons, and was it not that I hope by committing theſe my ſlender Labours to ſo Honourable a Patronage, I could not think any Worth or Excellency in them could tempt me to the Publication, neither can I modeſtly expect that any thing of mine ſhould find acceptance in ſo Learned and Critical an Age; however, from me to the Judicious it was intended, whoſe Cenſure I dare abide.* Nun quam enim doctorum hominum caſtigationes moleſtè tuli, ſed in hâc imprimis tractatione veritatis, etiam imploro. *But there is difficulty in the Production of Books, as well as other things.*

I need not tell Your Lordſhip, *what Diſcoveries* Arithmatick *and* Geometry *produceth, being rightly underſtood and aptly applied: the Uſe of both which I have here applied in* Planometry *and* Stereomitry, *and from thence framed Tables for the more Eaſe and Expedition in Menſuration, with ſo much* Horologigraphy, *as I thought moſt convenient; in which, I have endeavoured to behave my ſelf with the greateſt Care and Circumſpection, leſt this my preſent* Addreſs, *which I chiefly deſign as a Teſtimony of my Gratitude, ſhould be Ship-wreck'd and (in a manner) loſt upon that dangerous Rock of Adulation, which hath (in a great meaſure) been the Fate of many Mens Works.* Epiſtles *and* Orations, *that for the Elegancy of their Compoſure, and other Excellencies, have been far more Worthy of Eſteem, than any thing of mine can poſſible be imagined to be, but I can truly comply with* Origen. Gratias ago Deo, quod ignorantiam meam non ignorio. *As I ſeek no Praiſe, ſo I fear no Reproach; eſpecially if Your Honour ſhall allow it Your*

Patronage,

Patronage, which indeed it very much wants, For, Hoc eſt erroris proprium ut, quod cinque diſplicet, id aliis quoque opertere exiſtimet diſplicere. *What I have here perſormed, I freely leave to be determined by Your Honours clear diſcerning Judgment, and of other great Maſters of Art, Learning, and Reaſon. And if You particularly, Right Honourable, do pleaſe to allow it a place upon the meaneſt Shelf in Your Study, and to caſt Your Eye upon it when Your Freedom from more Weighty and Valluable Employments ſhall ſeem to invite You to it, and if Your Honour ſhall protect it by Your Patronage, from the Aſperſions of Malevolent and leſs deſcerning part of Man-kind. All which Your uſual Candor and Generoſity, do readily incline me to hope for; I ſhall then obtain moſt of the Chief Ends which I propounded to my ſelf in Compoſing and Compiling it; and moreover, I ſhall thereby be incouraged to make a further Progreſs in this kind of Study.*

May all the Bleſſings of Heaven and Earth, which according to the Rules of Piety and Prudence, Your Honour can either Wiſh or Pray for, be in a Plentiful manner poured down, by the God of all Goodneſs upon You and Yours. This (Right Honourable) is the frequent and hearty Prayer of your

Lordſhips moſt Faithful,

Humble, and Obliged

Servant,

JOHN WING.

THE

THE PREFACE TO THE READER.

Courteous Reader,

BEfore thou venturest upon this Work, as to paſs Judgment, firſt diligently peruſe me, and gently put back thoſe two Adverſaries, Young Ignorance, and Old Cuſtom, then mayest thou (without Spectacles) deſcern both the Pleaſure and Profit couched in theſe few leaves, let not Prejudice ſtop the way, that others has more compendiouſly performed this task; let me tell thee, I do Appeal to the Learned in theſe Sciences, and though I am ſenſible of many that hath done very well in Arithmatick, Geometry, Planometry, Stereometry, and Horologigraphy; either of which, would fill a Volumne much larger than what I have here performed in them all, in which I have not only uſed all the Brevity I could imaginably do, but have made each particular Plain and Perſpicuous to

mean

mean Underſtandings, eſpecially in Planometry, *and* Stereomitry, *having Compoſed Tables for that purpoſe, never extant, according to the preceding Rules delivered before the Tables, both in Natural and Artificial* Arithmatick, *which is applicable to all manner of Building, as* Maſon-work, Carpenders, Joyners, Glaſiers, Painters, Tylers, Sleaters, Plaiſterers, *&c. There being Examples in both Natural and Artificial* Arithmatick, *to perform what is by any of the forementioned Trades required; and to ſuch as do not underſtand* Arithmatick *in either kind, there is Tables to perform the ſame by bare inſpection. As to what I have done in* Dialing, *I ſhall give this exact account; firſt, as to the Inſtrument for taking Declinations, it is very eaſie, plain, and perſpicuous; and amongſt the varieties of ways for taking Declinations, it is moſt eaſie and exact. Secondly, for the* Horizontal, *South, and that declining* Dial *of* 20 *gr. Declination, they are Calculated and Projected by the Rules taught in ſeveral Authors; but as for the Eaſt and Weſt* Dials, *and of the far Decliner, which is* 81 *gr. from the South: I was forced (ſticking to my method of Calculation) to find out another way than has been taught by any; by which the Artiſt by dilligent Obſervation, may fill a Plain of any bigneſs, of which I have heard great complaint among Artiſts, and that there was no way ſufficient to perform this, with that due exactneſs as was required; and to fill a Plain of any bigneſs, for where the Declination is almoſt* 90 *Degrees (being near the Eaſt or Weſt Point) the Center is ſo far off, that to Calculate and Project from a Center, according to thoſe Rules, would never anſwer their expectation. The way which I have done it by, is by the Cannon of Signs,* Tangets *or* Logarithms, *without having any reſpect to the Center; in which way may be found much eaſe and exactneſs, 'tis* Multum in parvo, *which when*

it

it is perused, perhaps I may gain a favourable Censure, if not (with Marshal) Carpere vel noli nostra, vel ede tua. Facilius est reprehendere quam Imitæri, *and some can reprove without Authority, who will not admit Proofs with Authority; my weakness none better than my self are acquainted with, but herein holding to Truth, my Cause is the stronger. Eloquent words may please the Ear, but sufficient matter persuades the Heart; I am sure such as never Studied any good, will Study to find fault here, but leaving it to the more Considerable, I shall forbear to insist further by way of* Preface, *lest I make the Head too big for the Body, thus wishing you as much Profit by Reading, as my self Pains in Writing. I remain a Lover of all the Legitimate Sons of* Urania.

From my House at *Pickworth* in the County of *Rutland*, 1689.

JOHN WING.

CHAP.

Heptarchia Mathematica.

CHAP. I.

This First Book containing Arithmetick; *and first of* Numeration.

Numeration is to give an account of any Number propounded, according to their names and places; a Number is ſaid to have ſo many places as there are Figures in the Number, and if a Cypher be placed betwixt any two Figures, it addeth to the left hand Figure, or Figures, according to their places. The nine Characters of the Figures, are theſe, *viz.* 1 one, 2 two, 3 three, 4 four, 5 five, 6 ſix, 7 ſeven, 8 eight, 9 nine, 0 cypher.

When a Number propounded or given to be numbred, you muſt know the number of the Figures, and the order of places is from the right hand to the left. So ſuppoſe 742 were a number given, the Figure 2 ſtands in the firſt place, 4 in the ſecond, 7 in the third; if this number 2590 were given, the 0 ſtands in the firſt place, 9 in the ſecond, 5 in the third, 2 in the fourth; now, for the true pronouncing of any number given, the firſt Figure of any number towards the right hand, is the place of Unites, the ſecond is the place of Tens, the third the place of Hundreds, the fourth the place of

Thouſands, the fifth the place of Tens of Thouſands, the ſixth the place of Hundreds of Thouſands, the ſeventh the place of Millions, the eighth the place of Tens of Millions, the ninth the place of Hundreds of Millions, and ſo on further if neceſity requireth: but in practice you will hardly ever meet with a number that exceeds nine Figures. I ſhall inſtance in one Example of nine Figures, which let be 253269450, in the reading or pronouncing this Sum, obſerve, that the thtee Figures towards the right hand, ſtand in the place of Hundreds, the next on the left hand, are in the place of Thouſands, the three next in the place of Millions; and after this manner you may pronounce the aforeſaid number, Two Hundred Fifty Three Millions. Two Hundred Sixty Nine Thouſand, Four Hundred and Fifty, and any other number that exceeds not nine Figures you may give account of, the aforeſaid rules being underſtood.

CHAP. II.

Addition of whole Numbers.

Addition is that by which many numbers are gathered or added together, that in the end their ſum Aggregate, or Total may be found. In addition place the numbers given one above another, that is Unites above Unites, Tens above Tens, Hundreds above Hundreds, and ſo on according to the number of places given. Let us ſuppoſe theſe two numbers, 2376 and 512 be given to be added together, ſet them one under another as you ſee in the Margent, and draw a line under them as you ſee, then begin with the Unites and ſay, 2 and 6 makes 8 which place

place under 2 and 6 then to the next, being the place of Tens, ſay 1 and 7 makes 8, then to the next place, being the place of Hundreds, and ſay 5 and 3 makes 8, laſtly, bring down the fourth place 2 ſo is the work finiſhed, whoſe Sum amounteth to 2888 as in the Margent.

2376
512
2888

But let theſe three numbers be given to be added together, *viz.* 5716, and 6354, and 247, place them as before is taught, and if any of the ranks amount to above ten write down the exceſs, and for the odd 10 keep 1 in your mind, ſo 7, 4, and 6, makes 17, ſo is the exceſs above 10, 7, ſo I write down 7 and the 1 that I have in my mind, I carry to the next rank, ſo 1 and 4 and 5 and 1 makes 11, ſo 1 being the exceſs above 10, I write down the 1, and for the 10 I carry 1 in my mind as before. Then again 1 and 2 and 3 and 7 makes 13 ſo 3 being the exceſs above 10 I write down 3 and carry 1 for the 10 as I ſaid before; ſo 1 and 6 and 5 makes 12 it being the laſt number, I write it down orderly under the line, ſo doth the whole Sum amount to 12317.

5716
6354
247
12317

And if any number be given, that the firſt rank exceed 10, 20, 30, 40, 50, or any number of tens, write down the exceſs above the tens, and for ſo many tens as there is in number above the exceſs, ſo many Units carry in your mind to the next rank of Figures, and ſo may you proceed from one rank to another till you have compleated your whole work, which is ſo plain, I ſhall forbear to ſay more of it.

CHAP. III.

Subſtraction of whole Numbers.

Subſtraction is, that one number being taken out of another, to the end that a remainder or difference may be known; that number the *Subſtraction* muſt be made from, is to be greater than your other number, and for placing the number in *Subſtraction*, it is the ſame as is before taught in *Addition*. Let this number 7563 be given to be ſubſtracted from 9774, place one above another as you are before directed, placing your greateſt number uppermoſt, otherways your Subſtraction cannot be made; then begin with your Subſtraction and ſay, 3 from 4 and there remains 1 which write under the line in the ſame rank; then to the ſecond rank and ſay, 6 from 7 and there remains 1 which place in the ſame rank under the line; then proceed to the next and ſay, 5 from 7 and there remains 2, which place under the line as before; then proceed to the laſt, ſaying 7 from 9 and there remains 2 which ſubſcribe under the fourth rank, and the work is done: the remainder or difference is found to be 2211.

9774
7563
2211

Again, let be required to ſubſtract one number out of another; when the Figures of the under number are greater than the upper number, it is to be ſubſtracted from, in ſuch a caſe you muſt borrow 10 of the next rank towards the left hand, and add it to the Figure above, which makes the Figure more by 10 than it is of it ſelf, and for the 10 that you borrowed, keep 1 in your mind, which add to the next number given to be ſubſtracted, and ſubſtract all out of the numbers above till the work be finiſhed.

Exam.

Exam. It is required to ſubſtract 753, from 2542, begin then with the place of Unites and ſay, 3 from 2 which cannot be, wherefore borrow 10 of the next rank and add it to 2 which makes it 12, then ſay 3 from 12 and there remains 9, then for the 10 which I borrowed I carry an Unite *(or one)* in my mind, and add it to the next Figure, namely 5, then 5 and 1 makes 6, then ſay 6 from 4 that I cannot have, then muſt I borrow 10 of the next rank as before, and add it to 4 which maketh 14, then take 6 from 14 and the remainder is 8, then again, 1 that I have in my mind added to the next Figure 7 makes 8, then ſay 8 from 5 which connot be, borrow 10 as before and add to 5 which maketh 15, then ſay 8 from 15 there remains 7, then for the 1 I have in mind, having no Figure to add it to I ſubſtract it from the next figure 2 and the remainder is 1 thus the work being finiſhed and the remainder, difference, or number ſought, is found to be 1789.

2542
753
1789

CHAP. IV.

Multiplication of whole Numbers.

Multiplication is that which teacheth us by having two numbers given to find a third, of the two numbers given in *Multiplication*, the greater ought to be placed uppermoſt, and is called the *Multiplicand*, and the number placed under the *Multiplicand* is called the *Multiplicator*, the number produced by theſe two, is called the *Product*.

Let it be required to multiply 324 by 2, the ſame order is to be obſerved in placing your number as in *Addition*, which done with a line under them, proceed to your *Multiplication* and ſay, 2 times 4 makes 8 which place under the line in the ſame rank; this done, ſay again, 2 times 2 makes 4 which place orderly under the line; then again, 2 times 3 is 6 which place under the line as before, ſo the *Product* of this *Multiplication* is found to be 648, and here you muſt nnderſtand that if your *Multiplicator* had conſiſted of more figures than one, you ſhould have worked after the ſame manner, placing them orderly under the ſame rank, and ſo on the left hand till the work be finiſhed; but if your number given to be multiplied when the *Product* of each particular fignre exceeds 10 keep one in your mind, or if the exceſs be above 20 write it down and keep two in your mind, if above 30 keep 3 in your mind, *&c.* which is to be added in the next rank.

324	*Multiplicand*
2	*Multiplicator*
648	*Product.*

Examp. Let it be required to multiply 5762 by 45, place them as before, and as in this *Example*, and begin with the firſt figure towards the right hand, *viz.* ſaying 5 times 2 makes 10, now becauſe the exceſs above 10 is nothing, I write a cypher 0 under the line in the ſame rank, and for the 10 keep 1 in your mind; then ſay again, 5 times 6 makes 30 to which if I add 1 that I kept in my mind, it makes 31, ſo 1 being the exceſs above 30, I write down 1 under the line in the ſame rank, and for the 3 tens keep 3 in mind, again ſay

5762	
45	
28810	
23048	
259290	*Product.*

5 times

5 times 7 is 35, to which I add 3 which I kept in my mind, the whole is 38, ſo 8 being the exceſs above, three tens which I put orderly under the line, and I keep 3 in mind; then again ſay 5 times 5 is 25, to which if I add the 3 I kept in mind, the number is 28, and becauſe it is the laſt I write down the whole ſum 28 under the line, ſo the ſingle *Product* ariſing from 5, is 28810, then begin with the next Figure of your *Multiplicator*, *viz.* 4, and proceed to multiply as before, ſaying 4 times 2 makes 8, which place under the line and under 4 being the ſame rank; then again ſay 4 times 6 is 24, ſo 4 being the exceſs above, 2 tens I put down 4 under the line, and keep in mind for the two tens; again 4 times 7 is 28 to which add 2 I kept in mind, and it makes 30, the exceſs being nothing, I write a 0 cypher under the line as before, and for the three tens keep 3 in mind, then ſay 4 times 5 is 20, to which add 3 I kept in mind, the ſum is 23 it being the laſt of my *Multiplication*, I write it down under the line towards the left hand, which *Product* is 23048, which two ſums added together, produceth the mean *Product* 259290, and thus may you multiply by 1, 2, 3, 4, 5, or more Figures as neceſſity requires.

CHAP. V.

Diviſion of whole Numbers.

Diviſion teacheth to find out how many times one number or ſum is contained in another, or to divide any number into as many equal parts as ſhall be required.

There are three remarkable numbers in *Diviſion*, the names are theſe, the *Dividend*, the *Diviſor*, and

the *Quotient*, the *Dividend* is that number which is given to de divided, the *Divisor* is the number by which the *Dividend* is to be divided; the *Quotient* is the nnmber that ariseth from the Divsion.

Let us now for the first Example divide 576 by 4, write down your numbers as in the Margent, and ask how often you can have the *Divisor* 4 in 5, which is the first figure of your *Dividend*, which can be had but once, place 1 behind the crooked line which is to be the *Quotient*, then multiply the figure placed in the *Quotient* by your *Divisor*, and write the *Product* under the *Dividend*, from which it must be substracted, so multiply 4 by 1, or 1 by 4, which is all one, the *Product* is 4 without any alteration, which substract from 5, the remainder is 1, draw a line under your *Divisor*, and place your remainder 1 orderly under the line, then transcribe the next figure of your *Dividend* which is 7, and place your *Divisor* orderly under it, then ask how often your *Divisor* 4 is coutained in your new *Dividend* 17, which being 4 times, which 4 place behind 1 in the *Quotient*, then multiply your *Divisor* 4 by 4 the last figure placed in the *Quotient*, and the *Product* is 16 which substract from 17 the remainder is 1, which place under the line as in the Example, then transcribe 6 the last figure of your *Dividend*, so have you another new *Dividend*, to which bring down 4 your *Divisor*, and ask how often your *Divisor* 4 is contained in your new *Dividend* 16, which is 4 times, which 4 place in the *Quotient*, and multiply it by your *Divisor* 4, and the *Product* is 16, which substract from your new

```
576
4
——(1 Quot.
1
```

```
576
4
——
17
 4 (14
16
——
 1
```

new *Dividend* 16 and the remainder is 0, thus the whole work is finiſhed and the *Quotient* found to be 144, the whole ſtands as you may ſee in the Margent, and this is called ſingle *Diviſion*, becauſe the *Diviſor* is but one figure, but when the *Diviſor* conſiſts of more figures than one, the work is more difficult than the former, but being well inſtructed in the former, the following will be more readily apprehended.

```
576
4
---
17
 4  (144
16
---
 16
  4
 16
---
 00
```

Let us ſuppoſe this number 52063 to be given to be divided by 232 in placing your number you are to obſerve, that if your *Diviſor* be greater than the ſame number of figures of the *Dividend* above it, then remove your *Diviſor* one figure forward towards the right hand, and then the work will be the ſame with the following; your numbers being placed as before directed, make a crooked line on the right hand of your *Dividend* to place your *Quotient* in, then proceed to your work and ask how often 232 may be taken out of 520, or ask how often 2, the firſt figure of your *Diviſor* may be taken out of 5 the firſt figure of your *Dividend*, which in this Example is found to be twice, which 2 place behind the crooked line for the firſt figure in your *Quotient*, then multiply 232 the *Diviſor*, by the figure placed in the *Quotient*, and the *Product* of that multiplication will be 464, which place under the *Diviſor*, and draw a line under them, then ſubſtract 464 from 520 (the three firſt figures of your *Dividend*) the remainder is 56, which place orderly under the line; this done, the next figure of your

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52063
232
464  (2
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566
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Dividend

Dividend is to be placed on the right hand 56, ſo will your number be 566 for a new *Dividend*, then place down your *Diviſor* under 566 your new *Dividend*, and work as before, asking how often 232 may be taken out of 566, or rather ſay 23 out of 56, or 2 out of 5, which in this example can be taken twice, place 2 in the *Quotient*, then as before multiply the *Diviſor* by the figure laſt placed in the *Quotient*, and the *Product* is 464, which ſubſtract from 566 (your *Dividend*) and the remainder is 102, then bring down 3 the laſt figure of your firſt *Dividend* to the remainder 102, ſo will the number be 1023 for another new *Dividend*, then as before place down your *Diviſor* orderly under the new *Dividend*; now becauſe the new *Dividend* conſiſts of one place more than is in the *Diviſor*, it muſt be asked how often the firſt figure of your *Diviſor* is contained in the two firſt figures of the new *Dividend* 10, which may be had five times, but becauſe the next figure of your *Diviſor* cannot be taken ſo many times out of the figure above it, I muſt take a leſs number which let be 4, which write in the *Quotient*; then again multiply your *Diviſor* by 4 the laſt figure placed in the *Quotient*, and the *Product* is 928, which is to be ſubſtracted from 1023 and the remainder is found 95, which is ſo many parts of the *Diviſor*, the whole Operation being finiſhed, the *Quotient* ſought is found 224 $\frac{95}{232}$, ſee the work in the Margent.

52063	
232	
464	
566	(22
232	
464	
1023	
52063	
232	
464	
566	
232	
464	(224 $\frac{95}{232}$
1023	
232	
928	
095	

Divi-

Diviſion and *Multiplication* do always prove one another; in *Diviſion* multiply the *Diviſor* by the *Quotient*, and add the remainder to the *Product*, the Sum will be the ſame as the *Dividend*.

To prove *Multiplication*, divide your *Product* by your *Multiplicator*, and the *Quotient* produceth the *Multiplicand*.

CHAP. VI.

The Rule of Three *direct*.

THe *Rule of Three*, as many call it, the *Golden Number*, for the excellency of it, and is alſo (properly) call'd the *Rule of Proportion*, as by ſome examples hereafter ſhall be made plain; for having three numbers given that are known, it teacheth to find out a number unknown in proportion to them; and this *Rule* is performed by *Multiplication* and *Diviſion*; for by multiplying the ſecond number into the third, or third into the ſecond, which is all one, the number thence ariſing divide by the firſt number, ſo the number ariſing from your *Diviſion*, is the fourth number required; ſo if 6 foot of Board coſt 12 *d.* what ſhall 9 foot coſt? In the *Rule of Three* direct, the fourth number that is ſought, is to have ſuch proportion to the ſecond, as the third hath to the firſt; in the former queſtion, the fourth number is to have ſuch proportion to 12, as 9 hath to 6, but in a direct proportion we ſay, as 6 is to 12, ſo is 9 to the fourth number requi-

f.	*d.*	*f.*	*d.*
6-	12-	9-	18

9

108 —— *Product.*
6 —— *Diviſor.*

48
6 (18- *Quotient.*
48

99 red.

red. In the placing of your numbers you are to observe to place them as they are propounded, multiply the second term by the third, *viz.* 12 by 9, and the *Product* is 108, which divide by 6 the first term, and the *Quotient* is 18, the fourth number found as was required, the work standeth as you see in the Margent, and this is the R*ule of Three* single. The *Rule of Three* compound, is when any of the numbers propounded, are of several denominations, as Pounds, Shillings, and Pence; or Days, Hours, and Minuits; or Yards, Feet, and Inches; if they be of two or three denominations, they must be reduced to the denomination propounded.

Example, If 5 Yards 8 Foot of Painting cost 8 Shillings, what shall 4 Yards cost? here the first term is of two denominations, *viz.* Yards and Feet, it must therefore be reduced to the least denomination, because they express things of different names, *viz.* Shillings into Pence, and Yards into Feet, the first number given is 5 Yards and 8 Feet, it must be reduced into Feet after this manner, multiply 5 Yards by 9 because there is 9 superficial Foot in 1 Yard, and add to the *Product* the 8 Foot, so will the reduced number be 53; in like manner must you reduce 8 Shillings into Pence, by multiplying by 12, because 12 pence makes one shilling, thus 8 multiplied by 12, the *Product* is 96 Pence; so must the third term 4 Yards be reduced into Feet by multiplying by 9, and the *Pro-*

53-96-36-65
36

576
288

3456 —— *Product.*
53 —— *Divisor.*
318

276 (65 *quotient.*
53
265

11 — *Remainder.*

duct

duct is 36; theſe 3 numbers being thus reduced to the leaſt denominations, the working of it will be the ſame as the former, and the numbers are to be placed as in the former example; which done, proceed to the work, multiplying 96 by 36, being the ſecond and third terms, the *Product* is found 3456, which divide by 53 the firſt term, the *Quotient* is 65 Pence and ſomewhat more, but it being leſs than a Farthing, we omitted it as uſeleſs.

The proof of this Rule, is by multiplying the fourth term by the firſt, and if the *Product* be equal to the *Product* of the ſecond and third term multiplied, the work is right, otherways not, and if there happen to be any thing remain after the work is finiſhed, it is to be added to the *Product* of the firſt and fourth terms multiplied, and that ſum will be equal with the *Product* of the ſecond and third term.

CHAP. VII.

The Extraction of the Square Root.

THe Extraction of the Square Root is by having a number given, by which we find the number ſought, by multiplying the given number in it ſelf.

Let it be required to extract the Square Root out of 1296, to prepare your number for Extraction, ſet over the figure 6 a prick, and upon the third next to it another prick thus 1296, and if the number had conſiſted of more places, it is but placing over every third figure a prick or dot, to the end of your number, always leaving one figure betwixt two pricks, and as many pricks as there are over the figures, ſo many figures muſt be in the *Quotient*; then proceed and take out the Root of 12 which is 3, and place it in the *Quotient*, then ſubſcribe the Square of the

the figure placed in the *Quotient* under the first Square of the number given, *viz.* 9 under 12, from which it is to be subtracted, and place the remainder 3 orderly under the line, then to the said remainder bring down 96, so the Square 96 being placed next to the remainder, the Sum will be 396 which we call the *Resolvend*; then double the Root, and place it before a crooked line on the left hand the *Resolvend*, which is to be a *Divisor*, the double of the Root is 6, then must the *Resolvend* be a *Dividend* all but the first figure towards the right hand, to wit, the place of Unites: then ask how often 6 your *Divisor*, may be taken out of 39 the *Dividend*, which may be had 6 times, which place in the *Quotient*, and betwixt the *Divisor* 6 and the crooked line: this done, multiply all the number on the left hand the *Resolvend*, by the figure last placed in the *Quotient*, and place the *Product* orderly under the *Resolvend*, so 66 multiplied by 6, the *Product* is 396, which substract from the *Resolvend*, the remainder is nothing, and thus is the work finished, the Root being found just 36. If after the work is done, any Fraction remain, you may to the right hand of the first number given, add a convenient number of Pairs of Cyphers, then esteeming it one entire number, work according to the former Rules, and so many points as were placed over the whole number, so many whole numbers will be in the Root; the rest towards the right hand will be the Numerator of a Decimal Fraction, which will consist of as many places as there were pricks over the

1296
9
6) 396 (3

1206
9
66) 396
396 (36 *Root.*
000

the Cyphers, which Numerator will be so many parts of 10, 100, 1000, 10000, &c. which is easily discovered thus, if the Nnmerator of the Decimal Fraction be but one Figure, it is so many parts of 10, if two Figures, it is so many parts of 100, &c.

CHAP. VIII.

The Extraction of the Cube Root.

THE Extraction of the *Cube Root*, is that by having a number given, and another number is found, which being multiplied by it self, and then by the *Product* that ariseth, produceth the number required.

Let it be required to extract the *Cube Root* out of 17576, set a point upon the first Figure towards the right hand, that is upon 6, then another prick upon the fourth Figure 7, and to the end of the sum, always leaving between every two pricks two Figures, and as many pricks as there are so made, so many Figures must be in the *Quotient*, then begin and find the *Cube Root* of 17, which is 2, for 2 times 2 is 4, and 2 times 4 is 8; If I had taken 3 it had been too much, for 3 times 3 is 9, and 3 times 9 is 27, which exceeds the *Cube Root* 17, therefore take always the next lesser number, but to our present example, draw a crooked line on the right hand the number propounded, and place the Root of 17 which is 2, then subscribe the Cube of the Root placed in the *Quotient*, which was found 8 under 17, the Cube of the number

```
 .  .
17576
8
------ (2
2576  Resolvend.
12
 6
------
126
```

given,

given, the numbers thus plac'd with a line under them, ſubſtract 8 from 17, and the remainder is 9, which place orderly under the line; then to the ſaid remainder 9 bring down the next *Cube* of the number given, which is 576, which makes 9576, which a *Reſolvend* next the *Root* in the *Quotient* is to be ſquared, that is multiplied in it ſelf, which makes 4 the Triple whereof is 22 which is to be ſubſcribed under the *Reſolvend* in ſuch manner that the firſt Figure of the Triple Square, *to wit*, the place of Units is to be placed under the place of Hundreds in the *Reſolvend*, then triple the *Root* placed in the *Quotient*, and place it under the *Reſolvend* in ſuch manner as the place of Units may ſtand under the place of Tens in the *Reſolvend*; ſo the Triple of the *Root* 2 is 6, which I place under 7 the place of Tens in the *Reſolvend*, the Triple Square of the *Root*; and the Triple of the *Root* thus placed, draw a line under them, and add them together in ſuch order as they are placed; the numbers thus added is to be a *Deviſor*, then let the *Reſolvend* only the firſt Figure towards the right hand be a *Dividend*, (to wit, the place of Units) then ask how often the Figures of your *Diviſor* may be taken out of Figures of the *Dividend*, and place the anſwer in the *Quotient*, thus by the Rules of *Diviſion* 126 the *Diviſor* may be taken out of 957 the *Dividend* 6 times, ſo I place 6 in the *Quotient*, and draw a line under the *Diviſor*, and multiply 12 the Triple Square by 6 the Figure laſt placed in the *Quotient*, then ſubſcribe the *Product* 72 under 12 the Triple Square, then multiply the Figure laſt placed in the *Quotient*, firſt by it ſelf, and then by the Triple number before ſubſcribed, placing this *Product* under the Triple number; ſo 6 multiplied firſt in it ſelf, produceth 36, which multiply by the Triple number 6, the *Product* is 216 which place under the Triple number, (to wit, Units

under

under Unites, Tens under Tens) this done, Cube the figure last placed in the *Quotient*, and subscribe the Cube under the *Resolvend* in such manner that the first place of the Cube, *to wit*, the place of Unites may stand under the place of Unites in the *Resolvend*, so the Cube 6 is 216; which place under the *Resolvend* as I said before; these three, *viz.* 72, 216, 216, thus placed, draw a line under them, and add them together as they are placed, which Sum amounteth to 9576. which substract from the *Resolvend*, the Remainder is 0 the whole work being finished, the Cube Root of 17576 is found to be 26.

```
17576
 8
-----
 9576
 12
   6 (26
-------
 126
 72
 216
  216
-------
 9579
-------
 0000
```

If any Fraction remain, annex a convenient number of *Ternaries*, of Cyphers to the number first given, then esteeming it one entire number, the work is to be performed according to the preceding Rules; and so many points as were placed over the whole number given, so many whole numbers will be in the Root: the rest towards the right hand will be a Fraction, as I shewed in the Extraction of the Square Root.

CHAP. IX.

Numeration of Vulgar Fractions.

A Fraction or broken number, is part of a whole number or Integer, as may be thus expressed, if you measure the length of any Superficies that contains three fourths, or three quarters of a yard;

you are to expreſs it thus, $\frac{1}{4}$ becauſe a yard is ſuppoſed to be divided into four equal parts, alſo a foot being divided into 12 equal parts called Inches, write four Inches thus, $\frac{4}{12}$, that is four 12 parts of a foot; but if the foot be divided into 100 equal parts, the Fractional part may be thus expreſſed, $\frac{36}{100}$, that is, 36 parts of a foot.

But here you are to take notice for the terms of the Fractions, that which is placed above the line, is called the Numerator, and the number under the line is called the Denominator, as in the laſt Example, 36 being the Numerator, and 100 the Denominator.

CHAP. X.

Addition of Vulgar Fractions and mixt Numbers.

IF the numbers given to be added, are ſingle Fractions, and have equal Denominators, add all the Numerators together; ſo is the Sum the Numerator of a Fraction; ſo $\frac{1}{9}$ and $\frac{2}{9}$ being given to be added, their ſum will be $\frac{3}{9}$, but when mixt numbers are given to be added, and the Denominators be equal, then add the Numerators together as before, and ſo much as the Numerators amount to more than the Denominators, it is the fractional part of the Denominator; ſo when this new Numerator or fractional part is placed over the common Denominator, if it exceeds it but once, one muſt be added to the Integer or whole number.

Let it be required to add $2\ \frac{7}{12}$ $3\ \frac{9}{12}$, their ſum will be found $\frac{4}{12}$, for if the Numerators 7 and 9 be added, their ſum is 16, that 4 above the Denominator 12; then add 2 and 3, the whole numbers together, which

which makes 5, to which add 1 the Interger which makes 6 Integers and $\frac{4}{12}$ of an Integer.

CHAP. XI.

Substraction of Vulgar Fractions and mixt Numbers.

WHen the numbers given are both single fractions, and the Denominators equal, substract the lesser Numerator from the greater, and the remainder is the new Numerator, which is to be placed over the common Denominator; as $\frac{3}{32}$ and $\frac{7}{12}$ given to be substracted, the difference is $\frac{4}{32}$, but if it be required to substract a fraction from a mixt number, and that said fraction is less than the fractional part of the mixt number, substract the lesser from the greater, and the remainder being annexed to the whole part of the mixt number, gives the difference.

Let $\frac{5}{6}$ given to be substracted from $\frac{4}{8}$ the remainder will be found $15\frac{16}{48}$, as by the following Rules will be made plain.

Multiply 5 by 8, so is the *Product* 40 a new Numerator, then multiply 4 by 6 and the *Product* is 24; lastly, multiply 6 by 8, which produces 48 for the *Product*, and the common Denominator; then substract 24 from 40, and the remainder is 16 for a Numerator, which is to be placed over the common Denominator $\frac{16}{48}$.

$$\begin{array}{rr} 15 & \frac{5}{6} \\ 0 & \frac{4}{8} \\ \hline 15 & \frac{16}{48} \end{array}$$

$$\begin{array}{ccc} 5 & 4 & \\ & \times & 40 \\ 6 & 8 & 24 \\ \hline 40 & \frac{24}{48} & \frac{16}{48} \end{array}$$

Again, if $\frac{5}{9}$ be substracted from $12\frac{7}{8}$ the remainder will be found to be (by the aforesaid Rules) $12\frac{23}{72}$ as by the Operation is manifest. But if a mixt number be given to

$$\begin{array}{rr} 12 & \frac{7}{8} \\ 0 & \frac{5}{9} \\ \hline 12 & \frac{23}{72} \end{array}$$

be ſubſtracted from a mixt number, as 18 $\frac{4}{7}$ being given to be ſubſtracted from 24 $\frac{2}{9}$ the remainder will be found 8 $\frac{22}{63}$; the working of it is the ſame with the former, only Subſtraction of the Integers as in whole numbers.

CHAP. XII.

Multiplication of vulgar Fractions and mixt Numbers.

IF the Numbers given that are to be multiplied, be both ſingle fractions, multiply the Numerators together; ſo is that *Product* a new *Numerator*; likewiſe multiply the *Denominators* together, which *Product* is the new *Denominator* ſought.

So if $\frac{3}{16}$ and $\frac{5}{7}$ be given to be multipled, the *Product* will be found $\frac{15}{112}$, for 5 multiplied by 3 produceth 15 for the new *Numerator*; and 16 multiplied by 7, gives 112 for the new *Denominator*; alſo $\frac{1}{9}$ and $\frac{7}{9}$ being multiplied as before, the Product will be found $\frac{7}{81}$. But let it be required to multiply mixt numbers, as 324$\frac{1}{4}$ by 62$\frac{1}{2}$, firſt multiply the whole numbers, and place the Products orderly as is taught in whole numbers; then multiply the fractions into the whole numbers croſs ways, *viz.* $\frac{1}{2}$ of 324 is 162 and $\frac{1}{4}$ of 62 is 15, which place as you ſee. Laſtly add them together and annex the fractional part $\frac{1}{8}$ to the Product, it being the Product of $\frac{1}{4}$ and $\frac{1}{2}$, which done, the Product ſought appears to be 20265$\frac{1}{8}$.

324$\frac{1}{4}$	
62$\frac{1}{2}$	
648	
1944	
162	
15	
20265$\frac{1}{8}$	

Likewiſe, if 25$\frac{1}{2}$ and 30 be multiplied together, the Product will be found 765.

CHAP.

CHAP. XIII.

Diviſion *by vulgar Fractions and mixt Numbers.*

IF the Numbers given be both ſingle fractions, multiply the Denominator of the Deviſor by the Numerator of the Dividend, ſo will the Product be a new Numerator; then multiply the new Numerator of the Deviſor by the Denominator of the Dividend, ſo is the Product a new Denominator, and that new fraction is the Quotient ſought. So if $\frac{1}{9}$ were given to be divided by $\frac{3}{8}$, the Quotient will be $\frac{27}{40}$ for if 9 be multiplied by 3, the product will be 27 for a new Numerator; then multiply 8 by 5, the Product is 40 for a new Denominator; ſo is $\frac{3}{8}$ $\frac{1}{9}$ $\frac{27}{40}$ the Quotient ſought. But when the numbers given are mixt numbers and whole numbers together, they muſt be reduced into improper fractions, as in the Chapter of Reduction: ſo $7\frac{1}{2}$ will be reduced into the improper fraction $\frac{15}{2}$ and 42 reduced to an improper fraction a ſo, $\frac{42}{1}$, then multiply 42 by 2 the Product is 84 for a new Numerator; then multiply 15 by 1, the Product is 15 for a new Denominator, ſo is $\frac{84}{15}$ the Quotient ſought, which may be reduced to its proper mixt number as in the Chapter for that purpoſe.

$7\frac{1}{2})42)\frac{15}{2}\ \frac{42}{1}\ (\frac{84}{15}$

$(5)84\ (5\ \frac{9}{15}$

CHAP. XIV.

Numeration of Decimals.

WHen a ſingle fraction hath for its Denominator an Unite in the place on the left hand,

and if there be nothing but Cyphers towards the right hand, it may be termed a Decimal of these kind that follow, *viz.* $\frac{1}{10}$, $\frac{7}{100}$, $\frac{45}{1000}$, $\frac{488}{10000}$, if the Numerator and Denominator both end with Cyphers, it may be reduced to lesser fractions; as $\frac{100}{1000}$ is reduced to $\frac{10}{100}$ or $\frac{1}{10}$, the like is to be understood of the rest that have Cyphers at the end of both numbers.

CHAP. XV.

Addition of Decimals.

GReat care of placing Decimal fractions to be added, is the greatest work of this part, which is to place every number under its proper Denominator, as whole numbers under whole numbers, Tenths under Tenths, adding them together as whole numbers, separating the whole numbers from the fraction, as in the following Example

20. 2376	70. 104	50. 016
15. 541	11. 9721	1. 07
52. 7531	56. 2379	. 8
88. 5417	138. 3140	51. 885

CHAP. XVI.

Substraction of Decimals.

THe same order is to be observed in placing the numbers for Substraction, as in Addition; and the Substraction to be made as in whole numbers, the distinction

distinction of Integers from the fractional parts, being observed as in Addition.

.962	.76	87. 0079	243. 271	50.
.771	05 37	.6570	52. 310	.760
.191	.73 63	86. 3509	190. 961	49. 240

CHAP. XVII.

Multiplication of Decimals.

IN Multiplication of Decimals, whether fractions or mixt numbers, they are to be multiplied as whole numbers, observing so many places of fractions as are in both the multipliers; so many Figures is to be cut off in the Product towards the right hand for the fractional part, and those which are left on the left hand are Integers or whole numbers, and if the Product do not consist of as many places as there are Decimals in both Multipliers; then prepare so many Cyphers as shall make that number up, this may only happen when the Product is a fraction.

20. 15721	.67	412. 32
21. 3	.0132	5
429 .348573.	.008844.	21028. 32.

CHAP. XVIII.

Division of Decimals.

IN Decimal Division the Dividend must some times have Cyphers postponed, that it may consist of more

more Decimals than the Diviſor, which may be increaſt at pleaſure, and if the Decimals in the Diviſor and Quotient do not amount to thoſe of the Dividend; then prepare as many Cyphers as may make them equal. Example, Let the Dividend be 172.5, and the Diviſor 3.746, then as I ſaid before, poſtpone a convenient number of Cyphers that may make way for the Diviſor, and then the work will ſtand thus. 3.746) 172.500000

Then perform the Diviſion as in whole numbers and it ſtands thus 3.746) 172.500000 (46049.

Now for to ſeparate the Integers from the Decimal parts is the Key to unlock the whole work, which may be performed two ſeveral ways.

I. Seperate ſo many figures from the Quotient toward the right hand, as may make the Decimals in the Diviſor equal to thoſe in the Dividend.

II. The firſt figure in the Quotient will always be of the ſame denomination with that firſt figure in the Dividend, which ſtandeth (or is ſuppoſed to ſtand) directly over the place of Units in the Diviſor.

Wherefore in this Example, the figure 3 which ſtands in the place of Units in the Diviſor, ſo that the firſt figure ariſing in the Quotient, muſt alſo ſtand in the place of Tens (or ſecond place of Intergers) and the next place on the right hand, muſt be the place of Units. So that the diviſion point will be betwixt 6 and 0, as here.

3.746) 172.500000 (46.049

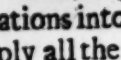
CHAP. XIX.

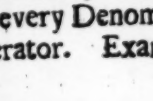
Reduction of Fractions.

I. REduction teacheth to bring Integers into Fractions, or contrary Fractions of divers denomi-

denominations into one, and first of proper fractions.

Multiply all the Denominators together for one common Denominator, then multiply every Numerator byasly by every Denominator, except his own, for a new Numerator. Example.

Reduce  into two other fractions of one Denomination. Answer, $\frac{1}{10}$ $\frac{8}{10}$.

Again Reduce  to one name

Example,

35	54	56	42	The continual
9	6	6	9	Multiplation of
315	324	336	378	6 7 and 9 the Denominators.

Answer,

315	324	336
378	378	378

Again to

Reduce $\frac{1}{4}$ $\frac{1}{6}$ $\frac{1}{2}$ $\frac{2}{3}$ & $\frac{6}{7}$ into one Name

18	10	3	14	24	
2	4	7	2	2	The continual Multiplication of all the Nominators together, and continual Multiplication of all the Numerators Biasly gives the Answer as followeth,
36.	40.	21.	28.	48	
3	3	6	6	3	
108.	120.	126.	168.	144	
7	7	4	4	7	
756	840	504	672	1008	

$\frac{756}{1008}$ $\frac{840}{1008}$ $\frac{504}{1008}$ $\frac{672}{1008}$

II. To Reduce an improper Fraction.

Divide the Numerator by the Denominator, and the

the Quotient will bring forth the whole or mixt number sought, Example,

Reduce $\frac{924}{8}$ to Pounds 8) 924 (115 Ans. 115 4 remains. $\frac{4}{8}$. Again,

Reduce $\frac{7289}{12}$ to Pounds 12) 7289 (607 Answ. 607 5 remains. $\frac{5}{12}$

III. To reduce a whole number into an improper Fraction. Let the number given be the Numerator, and 1 the Denominator.

Example, Reduce 13 Integers into an improper Fraction. Answ $\frac{13}{1}$.

IV. A mixt number given to be Reduced to an improper Fraction.

Multiply the whole number by the Denominator of the Fraction, and to the Product add the Numerator, so shall it be a new Numerator to the Fraction required; then let the Denominator given be for a new Denominator. Example.

Find a broken number equal to ——— 5 $\frac{3}{8}$

8

40

Answ. $\frac{43}{8}$ 3 add

43 Again,

Reduce 324 $\frac{19}{249}$ to an improper fraction.

Example 324 $\frac{19}{249}$

249

2916

1296

64819 Added in

80695

Answer $\frac{80695}{249}$

V.

V. To Reduce Compound or Particle fractions.

Multiply the Numerator and the Denominator together for a new Numerator. Example.

Reduce $\frac{2}{3}$ of $\frac{1}{8}$ to a fraction of one Name.

$\frac{2}{3}$ of $\frac{1}{8}$ $\frac{10}{24}$ Answer $\frac{10}{24}$.

Again

Reduce $\frac{1}{5}$ of $\frac{7}{8}$ of $\frac{3}{10}$ to one Name.

$\frac{188}{400}$ $\frac{3}{5}$ of $\frac{7}{8}$ of $\frac{3}{10}$. $\frac{21}{40}$ $\frac{168}{400}$ Answer $\frac{188}{400}$

CHAP. XX.

An Explanation of the Symbols *used in this Book.*

THis = is a Sign of Equality or Equal, as 7 + 3 = 10, or 5 + 2 = 4 + 3, that is in words 7 and 3 added is equal to 10, and again 5 and 2 added is equal to 4 and 3 added.

This + is a Sign or Mark of Addition, or More, as 3 + 5 = 8; which in words is to be read thus, 3 added to 5, or 3 more, 5 is equal to 8.

This — is a Sign of Subtraction, or Less, as 9 — 5 which also imports 5 Subtracted from 9, which is always understood when this Mark is placed betwixt two numbers.

This × Character is a Sign of Multiplication, or drawn into, when it is placed betwixt two numbers it signifies they are to be multiplied together; as 6 × 4 to be multiplied, whose Product is 24, or 6 × 4 = 24, that is, 6 multiplied by 4 is equal to 24.

Sq. R. the Square Root Extracted, or to be Extracted according to the Production of the Opperation.

Cu. R. The Cube Root, which is to be taken notice of according to its Scituation. These

These Pricks : thus and :: thus, are ca'll'd Terms of Proportion as thus, B C: S. B D C:: C D: S. C B D, which are thus to be pronounced, as B C is to the Sign B D C so is C D to the Sign C B D. The rest are these *viz*. R the Radius, S. the Sign, C S the Cosine, T the Tangent, C T the Cotangent.

+ If this Sign of Addition be placed at the end of a number, so that no number follows, it signifies the preceding number is not exactly true, but is the nearest.

This

This Second Book contains the Geometrical *Deſcription and Menſuration of the Superficies herein contained; And a more Perfect and Plainer Way of Meaſuring all manner of Works belonging to Buildings, both Superficial and Solid, each Operation being Exemplified in Natural* Arithmatick *and by* Logarithms.

CHAP. I.

The Deſcription and Menſuration of a Geometrical *Square.*

A *Geometrical* Sqare conſiſts of four equal ſides and by having one of the ſides given, the Content may be found by ſquaring one ſide, and the Product will produce the Aare; that is multiplying one ſide in it ſelf. Each ſide we will here ſuppoſe to be 52, which ſquared, gives in the Product 2704 for the Aare or Content of that ſquare whoſe ſides are equal to 52.

By Logarithms thus.

Side of the Square 52 —— 1. 71600
Again —— 1. 71600

Aare or Content — 2704 —— 3. 43200

The *Logarithm* belonging to one ſide of the Square, being ſet down twice and added, gives 3. 43200, whoſe

whoſe Number Coreſpondent is 2704 for the Aare as before.

PROP. II.

The Deſcription and Menſuration of a Parallelogram.

A *Parallelogram* is no other than a long Square, and is meaſured by multiplying the length by the breadth, which length let be 78 and breadth 25, the Product of which two Sums multiplied, is 1950 for the Aare.

By *Logarithms* thus.

The Length	78	1. 89209
The Breadth	25	1. 39794
The Aare	1950	3. 29003

Add the *Logarithms* of the two unequal ſides, and the Sum is the Aare.

PROP. III.

The Deſcription and Menſuration of a plain Triangle.

A *Triangle* is a *Geometrical Figure* containing three ſides, the longeſt we call the Baſe, and a right line being drawn from the Angle to the Baſe, is call'd the Perpendicular, and its Demenſions we will here ſuppoſe to be, firſt the length of the Baſe 82 and the Perpendicular 20, then to find the Aare.

I. Multiply 82 the length of the Baſe by 20, the Perpendicular and the Product is 1640 whoſe half 820 is the Aare.

Loga-

Logarithmetically.

Length of the Baſe 82 —— 1. 91381
Perpendicular 20 —— 1. 30103

Sum 1640 half is 820 *Aare* — 3. 21484

II. Multiply the half Baſe by the whole Perpendicular, *viz.* 41 by 20, the Product is 820 for the Content.

Logarithmetically.

Half the Baſe 41 —— 1. 61278
Perpendicular 20 —— 1. 30103

The Aare — 820 —— 2. 91381

III. Multiply the Baſe 82 by 10 the half Perpendicular, the Product 820 is as before the *Aare*.

Logarithmetically.

Length of the Baſe 82 —— 1. 91381
Half Perpendicular 10 —— 1. 00000

The *Aare* or Content 820 —— 2. 91381

There are other ways to meaſure a Triangle, as to add all the three ſides together, and of that Sum take the half, then ſee what each ſide differs from that half, and multiply that half by one of the differences, and the fact is multiplied by the third difference, whoſe Sq. R. is the *Aare*.

PROP. IV.

The Deſcription and Menſuration of a Trapezium.

A *Trapezium* is a figure that conſiſts of four unequal ſides, and is meaſured by two Perpendiculars from each *Angle*, falling at right *Angles* upon the Baſe, whoſe length we will ſuppoſe to be 22 and 18, and the length of the Baſe 64. I.

I. Multiply half the Sum of both Perpendiculars 20 into 64, the whole Base and the Product is 1280 for the Aare.

By *Logarithms.*

Length of the Base 64	——	1. 80618
Half sum of Perpen. 20	——	1. 30103
Aare or Content 1280	——	3. 10721

II. Multiply half the Base, which is 32, by 40 the sum of both the Perpendiculars, the Product is 1280 as before.

Logarithmetically.

Sum of the Perpendicular 40	——	1. 60206
Half the Base —— 32	——	1. 50515
The Aare as before —— 1280	——	3. 10721

PROP. V.

The Description and Mensuration of Regular Poligons.

ALl Regular *Poligons* are figures consisting of equal sides, as a *Pentegon* consisting of five equal sides, a *Hexagon* six, a *Heptagon* seven, an *Octagon* eight, *&c.* In all Regular *Poligons*, lines being drawn from the Center to the Sides, touching the Circumscribed Circle, will divide it into so many *Isosceles* Triangles, as there are sides thereunto belonging, each Triangle bearing its exact proportion to the whole, according to the number of the Sides. As for instance, a *Pentagon* divided as before, will consist of 5 *Isosceles* Triangles, each being one exact 5 part; in a *Hexagon* 6, *Heptagon* 7, and so of the rest. This supposed, let fall a Perpendicular from the Center at right *Angles* to one of the Sides, will

divide that Isosceles Triangle into two equal parts, in which we have giveu the half side, then to find the lesser Angle, divide the circumscribed Circle (which is always 360) by the number of sides, half which quotent will be the lesser Angle, its Complement to 90 is the other Angle; then say as the sign of the lesser Angle, to the *Logarithm* of half one of the sides. So is the sign of the greater Angle to the *Logarithm* of the perpendiculars length; then to find the Content, multiply the half of the *Perimeter* by the perpendicular, the Product of which multiplication will produce the Content as we shall here Illustrate in an Octagon, that is a Figure consisting of eight equal sides, the length of each side is 24, a perpendicular let fall from the Center to the middle of one of the sides divideth that side into two equal parts that is 12, then dividing the Circle 360 by 8 the number of sides, the quotent is 45, whose half is 22. 30. whose Complement to 90 is 67. 30. then enquire by

Logarithms and Signs.

As the sign of the lesser Angle	22° 30′	9.58284
to the Log. of half one of the sides	12	1.07918
So the sign of greater Angle	67 30---	9.96561
to the Log. of the perpen. length	29	1.46195

Then to find the Aare.

Multiply the perpendicular 29 by half the Peremiter 96, which gives in the Product 2784 for the Aare.

Logarithmetically.

Half the Peremiter 96	1.98227
The Perpendicular 29	1.46239
Aare or Content 2784	3.44466

PROP. VI.

To measure a Circle, Semi-Circle and Segments.

THe first thing to be found, is by having the Diameter to find the Circumference; or contrariwise, by having the Circumference to find the Diameter, for which observe these following Proportions.

As 7 is to 22, so Diameter to Circumference.

Contrary.

As 22 is to 7, so the Circumference to Diameter.

Example, Admit the Diamatsr of the Circle given be 54. 6, which according to the preceding Proportion both in Natural and Artificial Numbers, gives 171. 5 for the Circumference, and 54. 6 for the Diameter, then to find the Aare.

I. Multiply 85. 7 being half the Periphery, by 27. 3 the Semi-diameter; the Product is 2339. 6 for the Aare.

Logarithmetically.

Half the Periphery——	85.7 ——	1.93298
The Semi-diameter——	27.3 ——	1.43616
The Aare————————	2339.6——	3.36914

II. To find the Aare by having only the Diameter, Say, as 28 is to 22, so is twice the Diameter to the Aare. Or having the Circumference.

As 88 is to 7, so is twice Circumfereece to Aare.

III. Or as 7 to 22, so the Square of the Semi-diameter to the Aare or Content.

Logarithmetically.

As 1. to 3. 1416, whose *Log.* is———		0.49715
So the Sq. of the Semi-diameter	745.3 -	2.87233
Aare 2341————————		3.36948

Differing

Differing a very little matter from the former way, which difference may arise two several ways; as first, the Proportions for finding the Diameter and Circumference, are known not to be precisely true, though it varies very little. Secondly, These constituted Numbers being only the nearest to *Geometrical* Demonstration.

To Measure a Semi-circle or Segment of Circle, is by multiplying the Semi-diameter into half the length of the Arch-line, and the product will produce the Aare.

PROP. VII.

To Measure the Superfices of a Sphere *or* Globe.

MUltiply the *Diameter* by the *Circumference*, the *Product* is the Result of the Question. The *Circumference* of which we will here suppose. 171.5 whose *Diameter* is 54. 6. which multiplied together, gives 9363. 90 for the Spheres Superficies.

Logarithmetically.

Circumference	171.5	3.23426
Diameter	54.6	2.73719
Globes Superficies	9363.90	5.97145

Otherways.

As 7 to 22 so the Square of the *Axis* to the Superficial Content. Or,

As 22 to 7 so the Square of the Circumference to the *Convex* Superficies.

PROP. VIII.

The Deſcription and Menſuration of an Ellipſis.

AN *Ellipis* is made by two Pins prickt down at a convenient diſtance, about which put a ſtring tied together at both ends the length and diſtance of the Pins as occcaſion requires, then into the ſtring put a Pen or tracing Pin, and hold the ſtring ſtreight, which carried curiouſly about upon the Paper, will deſcribe the Ellipſis whoſe content is found by multiplying the Tranſvers and Conjugate Diameter, to gather the Square Root of which Product is the Diameter of a Circle equal to the Ellipſis.

Ex. Of an Ellipſis whoſe Tranſvers Diameter is 54, and the Conjugate Diameter 46, the Product thence arſing is 2484, whoſe Sq. R. by the VII. Chap. of the firſt Book is 49.8 but with much more eaſe by *Logarithms* thus.

Tranſvers Diameter 54		1.73239	
Conjugate Diameter 46		1.66276	
Product	2486	3.39515	half is
Sq. R.	49.8	1.69757	Sq. R.

This Sq. R. being a main betwixt the Tranſvers and Conjugate Diameter whoſe Circumference anſwering, is 1564. the Aare thence produced as in Prop. 6 of this Chap. is 1947.18 for the Aare of the ſaid Ellipſis, but the exacteſt way to meaſure a Geometrical Oval (it being made by the interſection of two Circles) is to take the middle into a ſquare, *viz.* from the interſections which will divide the Oval into five parts, *viz.* two Segments of the greater Circle,

Circle, & two of the leſſer and the Geometrical ſquare by them included, theu conſult Prop. the I. and VI. of this Chap. for the true Aare thereof.

PROP. IX.

The Menſuration of any irregular Figure.

REduce the irregular Figure into Trapazias and Triangles from one Angle to another, letting fall perpendiculars from each Angle upon the Right lines, then may the content be found by the III. and IV. Prop. we ſhall need to ſay no more of Menſuration of Superficies, ſince the former Rules (if they be rightly underſtood) will perform the work of any Superficies Figures given or propoſed, for they cannot fail of coming under the notion of ſome of the aforeſaid Rules and Deſcriptions.

CHAP. II.

The former Chapter teacheth to find the true Aare of any Regular or Irregular Figures whoſe Numbers conſiſts of one Denomination, our next buſineſs is to explain and direct how to apply the former Rules in the meaſuring of all flat work belonging to Buildings, when the Dimenſions conſiſts of more than one Denomination.

PROP. I.

To Meaſure Board and Glaſs.

IF the Board to be meaſured be both ends of a breadth, if not, add the breadth at both ends,

and take the half for a true breadth, which multiplied into the length, gives the Content in that denomination the dimensions was taken in; if Inches, then the content is Inches, which divide by 144 (the number of Inches contain'd in a superficial foot) the Quotient will be the number of Feet, and the remainder will be Inches or parts of a Foot; where note, if 36 remain, 'tis a quarter, if 72 half, if 108 three quarters of a Foot. But if the length of the Board be given in feet, and breadth in inches, the content may be found by multiplying the length in feet by the breadth in inches, the Product arising divided by 12, gives the content in feet and parts; where note also, if 3 remain, 'tis a quarter, 6, half, 9 three quarters of a foot.

Example, A Board is 14 foot long, and 15 inches broad, which multiplied and divided as before, gives the content 17 $1\frac{2}{4}$, that is 17 foot and a half.

By *Logarithms* thus,

Length in feet 14	1.14613
Breadth in inches 15	1.17609
Sum	2.32222
Divisor or given number 12	1.07918
The Content 17.50	3.24304

Here the Characteristick is put 3 instead of 1 that it may discover the Fraction.

The same method is to be observed in measuring Glass, its content being required in feet also, in both which, if more curiosity be required (as in Glass especially) its dimensions may be taken in inches and 10th parts, for each inch is *Decimally* divided into 10 parts, or vulgarly into halves and quarters, which

which may either ways be caſt up by the preceding directions, which will produce its content in feet, inches, and parts of an inch.

PROP. II.

To Meaſure Wainſcot, Painting, &c.

IN the meaſuring of Wainſcot, Painting, or ſuch like, whoſe content is required in yards, let the dimenſions be taken in yards, feet, and inches, which reduce to the leſſer denomination, *viz.* Inches which multiplied, gives the content in Inches, which divide by the number of Inches in one Yard, and the remainder if it exceed the number in one Foot, divide by the number contain'd in a Foot, by all which will be found the exact number of Yards, Feet, and Inches, according to the dimenſions taken.

Examp. Of a Room that is Wainſcoted, Painted, *&c.* whoſe Girth is 10 Yards 3 Inches, or 368 inches, and the Heighth 4 Yards 2 Inches, or 146 Inches, which multiplied together, gives in the Product 53728 Inches, which divided by 1296 the number of Inches contained in one ſuperficial Yard, the Quotient will be 41 Yards, and the remainder 592 which becauſe it exceeds 144 (the number of Inches in one Foot) divide it by 144 which will give in the Quotient 4 feet, and the remainder 16 Inches, or $\frac{16}{144}$ of a foot, ſo that the exact content of the ſaid Room, appears to be 41 Yards, 4 Feet, and 16 Inches.

By Artificial Numbers.

The Girth in Inches 368	2.56585
The Heigth in Inches 146	2.16435
Sum	4.73020

Dividend or given number. 1296 3.11260

The Content of the Room 41.46 3.61760

But if Yard wherewith the dimenſions were taken, were divided into 100 equal parts, it would be much better and eaſier in finding the Content, becauſe Diviſion would be wholly omitted, as may appear by this one Example. Suppoſing the ſide of a Room to be 15 57 Yards, and the heighth 6.35, which multiplied, gives 98.87 for the Content.

Logarithmetically.

The Length	15.57	3.19229
The Heigth	6.35	2.80277
The Content	98.87	3.99506

'Tis pity that all meaſuring Rules appointed to meaſure by, are not divided into 10, 100, or 1000 equal parts, for 'tis both the eaſieſt and exacteſt method that can be obſerved, being the true Decimal Diviſion, fitting the moſt incomparable Decimal Arithmatick.

PROP. III.

To Meaſure Pavement, Walling, and Sleating.

ALl ſorts of Pavements are meaſured as is taught in *Prop.* I. the Content being required in feet, but in Walls and Sleating 'tis otherwiſe, for there the Content is uſually required in Rods, the Dimenſions being uſually taken in Feet, and the Content thereof being found in that Denomination, which may be reduced into Rods, by dividing by 324 being the number of Feet in one Rood, and if the remainder exceed 9, the number of Feet in one Yard, divide

divide that remainder by 9, ſo will the Content appear in Rods, Yards, and Feet, whether in Maſon Work or Sleating; to clear this point, we will here inſtance in a Wall or Sleat Roof whoſe length is 56 Feet, the heighth or depth 20 Foot, which multiplied, is 1120 Feet; then divide by 324, the quot. produces 3 Rods, 148 Feet, which divide by 9, ſo that the true Content appears to be 3 Rods, 16 Yards, 4 Foot.

By Logarithms.

The Length	56	1.74818
Heighth or Depth	20	1.30102
Number of Feet	1120	3.04920
Given Number	324	2.51054
The Content	3.45	2.53866

Maſons uſually (and indeed not without reaſon) claim double meaſure in Gouels and Dormant Pikes Piramids and ſuch like, and in Chimneys alſo, the back excepted, for that is always (according to the Rules of meaſuring) taken notice of in the Gouel, and in all Buildings wherein is vacancies, as Windows, Doors, or ſuch like, all runs into meaſure, if it be as wide as that a load of Corn or Hay can be driven in; for ſay they, there is as much trouble of fitting and ſetting Coines, as in drawing the Wall through ſuch a vacancy. Sleaters alſo claim an allowance at the Eves according to the cuſtom of the place; and Tylers alſo, who gives the Content of their Work in Squares, each Sqare containing 100 Foot.

I ſhall in the next place, inſert a few Examples of what I have imediately before treated of, to illuſtrate and explain the uſe of the Symbols or Characters deſcribed

described and explained in the XX. CHAP. of this first part.

PROP. IV.

Containing Practical Questions with Answers, in Superficial Measure.

1. IF the side of a Court (wherein all sides are equal) or Hall laid with Pavement be 30.4 foot, the content is 924.2 + as followeth, both by Natural and Artificial Numbers.

Example. 30.4 × 30.4 = 924.2 +

Logarithmetically.

30.4, 2.48287 + 30.4 2.48287 = 924.2, 3.96574.

2. If the side of a Room be Wainscoted in length 12.8 yards, and 6.3 in heighth, the content will appear 80.64 yards.

Example. 12.8 × 6.3 = 80.64.

Logarithmetically.

12.8, 2.10721 + 6.3, 1.79934 = 80.64, 3.90655.

3. If the heighth of a Pain or Light of Glass be 4.9 foot, and the breadth 1.7 the Area is 8.33 foot.

Example. 4.9 × 1.7 = 8.33.

Logarithmetically.

4.9, 1.69019 + 1.7, 1.23045 = 8.33, 2.92064.

4. If the length of a Wall be 120.5 foot, and the heighth 20.7 the content in Rods will appear to be 7 R. 25 Y. 1 F.

Ex. 120.5, × 20.7 = 249,43 feet = 7 R. 25 Y. 1 F.

Logarithmetically.

120.5, 3.08099 + 20.7, 2.31597 = 2494.3 F. = 7.70 R.

5. If the sides of a Roof covered with Tyle, be 142 foot in length, and 18 foot deep, the content in Square is 25.56.

Examp. 142 × 18 = 2556 F. = 25.56 S.

Loga-

Logarithmetically.

142, 2.15229 + 18, 1.25527 = 25.56, 3.40756.

6, If a Roof covered with Slate, the length whereof is 56.2 foot, and the depth (with the usual allowance at the Eves) 21.4, the content in Roods will appear to be 3 R. 25 Y. 6 F.

Ex. 56.2 × 21.4 = 1202.7 F. = 3 R. 25 Y. 6 F.

Logarithmetically.

56.2, 2.74974 + 21.4, 2.33041 = 1202.7, 4.08015
= 3.72, 2.56960.

I have added these few Practical Examples to inform the young *Tyro* in the use of these Characters, which will discover any thing in this nature in a very little room, including ease and expedition.

CHAP. III.

Containing Stereometry, *or the Mensuration of* Solids, *which doubtless is as Excellent in its Operations, as Infinite in its Numbers, as may appear by the following Propositions.*

PROP. I.

To Measure Solids *in the form of a Dye, called a* Cube.

A *Cube* is a square *Solid*, having equal length, breadth, and depth, containing six equal sides, and is measured by multiplying, first one of the sides in it self; and secondly, that Product multiplied by one of the sides, gives the content in that denomination the dimensions was taken in, if Inches, the content produced is Inches, which perhaps may be required to be reduced into Feet, which is done by dividing the solid content in Inches by 1728, the number of Inches in one solid Foot.

Example.

Example. Of a Log of Stone or Wood, whose sides are all 4 Foot 3 Inches, or 51 Inches, which multiplied in it self, is 2601 × 51 = 132651 the Solid Content in Inches, which divide by 1728 = 76 $\frac{1123}{1728}$ Feet.

Logarithmetically.

Side of the Cube	4.25	2.62839
Again	4.25	2.62839
Sum		125678
Side of the Cube	4.25	2.62829
Content in Feet	76.77	3.88517

PROP. II.

The Description and Mensuration of an Oblong Cube, *called a* Parallelopipedon.

A *Parallelopipedon* is a Solid containing four right Angles, the opposite sides being parallel one to another, and the Basis at both ends equal, being a Figure containing length, breadth, and depth, whose Content is found by multiplying the breadth by the depth, and the Product so produced, multiplied by the length, gives the Content according to the Dimensions taken; if Inches, it may be reduced to Feet, as in the former Proposition.

Example. Of a squared piece of Timber whose length is 2 Foot 3 Inches, or 27 Inches, the depth 2 Foot or 24 Inches, the length 20 Foot 9 Inches, or 249 Inches, then as before multiplying 27 Inches the breadth, by 24 the depth, the Product is 648, which multiplied by the length 249 Inches gives the Solid Content 161352 Inches, which divide by 1728, the Quote is 93 $\frac{648}{1728}$ Feet.

Loga-

Logarithmetically.

Breadth in Feet	2.25	2.35218
Depth in Feet	2.00	0.30103
Sum		2.65321
Length in Feet	20.75	1.31702
Content in Solid Feet	93.38	3.97023

Rule, If the same Timber Log had contain'd exactly so many Feet in length, then might the first Product in Inches have been multiplied by the length in Feet, and the Product arising divide by 144, would give the Solid Content in Feet and parts of a Foot; where note, if 36 remain, 'tis a quarter, if 82 half, 108 three quarters of a Foot.

This Rule may be observed in all Solids, having length, and the Aares at both ends equal, whether consisting of 3, 4, 5, 6, 7, 8, 9, 10, or more sides equal or not equal, provided as I said before, the Basis at both ends be alike and hold through.

PROP. III.

The Description and Mensuration of a Sylinder.

A Sylinder is a Circular Solid containing length, as Pillars, Columns, Timber Sticks, whose Diamiter is equal top and bottom, producing eqal Aares; the Solid Content of which is found by multiplying the Aare of the Circle into the length.

Examp, Of a Column or Timber Stick whose Diamiter is 30 Inches, which produces the Circumference 94.2, and consequently the Aare of the Circle 706.5 as is taught in the 6 Prop. of the first Chapter of this Book, which multiplied into the length (which

we will here suppose to be 12 foot 3 Inches, or) 14 Inches gives 103855 + the solid Content in Inches which divided by 1728 = 60 $\frac{175}{1728}$ feet.

Logarithmetically.

The Aare in Inches ——	706.5 ——	3.84911
Length in Inches ——	147 ——	2.16732
Content in Solid Inches	103855 ——	6.01643
Divisor ——	1728 ——	3.23754
Content in solid Feet ——	60.10 ——	3.77889

Otherways by this constituted number, 147.36, the length and circumference in Inches being given, the solid content in feet may be found by the Rule of Plural Proportion thus, as 147.36 to 94.2 the circumference; so 147 the length, to 93.9 a fourth number, and this fourth number 93.9 to 60 $\frac{25}{147}$ feet.

PROP. IV.

The Description and Mensuration of a Cone, *and its Frustums or Segments, as Round Tapering Timber,* &c.

A *Cone* is a Figure having length, and only one Base which is round, equally decreasing, and terminates in a Point, as the Spire of any round Steeple.

The Frustums of *Cones* is part of the *Cone* cut off, and hath two round Bases as round tapering Timber, whose Base is greater at the bottom than at the top, more or less according to the Taper, and parts of the Timber-stick cut off.

The solid content of the *Cone* is found by multiplying the Aare of the Base by one third part of the length. Where note, the true length is from the Center of the Base to the terminating point, and not the

the Hypothenuſe or Slope ſide, in which particular moſt Authors I have met with takes little or no notice of, which hath cauſed many who have followed the Text of their Authors, to give the ſolid content falſe, by reaſon of taking the length in a wrong place; but to find the true length, do thus, take the length of the Hypothenuſe or Slope ſide, which we will here ſuppoſe to be 950.2 Inches, and the ſemi-diameters length 75.4 Inches, that is, the ſemi-diameter of the Baſe, Square both theſe numbers, that is multiplying them in themſelves, ſo will the Square of 950.2 be 902880. and the ſquare of 75.4 = 5685, ſubſtract the ſquare of the ſemi-baſe, 5685, from 902880 the ſquare of the Hypothemuſe, and the remainder is 897195 whoſe Sq. R. = 947.2 Inches the true heighth required.

Then to find the ſolid content of the *Cone*, multiply the Area of the Baſe 474 Inches, by 316 Inches, a third part of the length, the Product is 149784 ſolid Inches, which divided by 1728 = 86 $\frac{1176}{1728}$ the content of the whole *Cone* in ſolid feet.

Logarithmetically.

Area of the Baſe	474	2.67578
$\frac{1}{3}$ part of the length	316	2.49968
Content in ſolid Inches	149784	5.17546
Diviſor	1728	3.23754
Content in ſolid feet	86.68	3.93762

To meaſure round tapering Timber which is the Fruſtum of a *Cone*, find the Areas of the Circles at either ends, which Areas multiply together, from which Product extract the Sq. R. which Root added into the Sum of both Areas, and that Sum multiplied by one third part of the length, gives the content.

Or

Or otherways find the part cut off, which taken out of the whole Cone, leaveth the Solidity of the Fruſtum; to find the whole length uſe this Analogy, as the difference of the Diamiters length to the length between them, ſo the Diameter of the great Baſe to the whole length of the Cone, ſo conſequently the part wanting comes to be known, which taken out of the whole length, the Solid Content of the Fruſtum of the Cone, or piece of round tapering Timber as we both ways illuſtrate.

I. *Examp.* Let the whole length of the Cone's Fruſtum be 30 Foot or 360 Inches, the Diameter of the greater Baſe 60.4 Inches, which gives the Circumference 189.8 Inches, & conſequently the Aare 2865.98, the Diamiter of the leſſer Baſe 16.8 Inches, giving the Circumference 52.7, from which is produced 221.76, the Aare, theſe two Aares multiplied together = 635560 Sq. R. 797.2 + 2865.98 + 221.76 = 3884.94 × 120 = 466193 Solid Inches in the whole Fruſtum, which divided by 1728 = 299.$\frac{1121}{1728}$ the number of Solid Feet contained in the ſaid Fruſtum.

Logarithmetically.

Greater Area	2865.9	4.45848
Leſſer Area	221.7	3.34576
	Sum	7.80424
Sq. R.	797.2 Radix	3.90212
Sum	3884.8	4.59016
$\frac{1}{3}$ of the length	120	2.07918
	Agreg.	6.66934
Diviſor	1721	3.23754
Solid Feet	270.3	3.43180

Givin

giving the ſolidity nearly with the above demonſtration in natural numbers.

II. Examp. Firſt, then (to demonſtrate this another way) find the whole length of the *Cone* thus, as the difference of 60.4 and 16.8 the Diameters which is 43.6, to 360 the length between them, ſo 60.4 the greater Diameter to 498.71 the whole length of the *Cone*, whereof $\frac{1}{3}$ of its length is 166.24, which multiplied by 28559 the Area of the greater baſe gives in the Product 476440 ſolid Inches in the whole Cone; then to find the length and quantity of the parts cut off, ſubtract 360 the length of the Fruſtum, from 498.71 the Cones length, and there remains 138.71 for the length of the leſſer Cone or top part wanting, $\frac{1}{3}$ of which length is 46.2 which multiplied by 221 7 (the Area of the Baſe of the leſſer Cone, or Baſe of the part cut off) = 10243 the ſolid Inches of the Biſſected Cone, which ſubtracted out of 476440 the ſolidity of the whole, leaveth 466197 ſolid Inches for the content of the Fruſtum, or tapering Timber-ſtick, which divided by 1728 = 269 $\frac{1045}{1728}$ ſolid feet contained in the ſaid Fruſtum; And becauſe an Example in Logarithms is more troubleſom than uſeful, in reſpect the Numbers exceeds the Tables, we ſhall forbear.

PROP. V.

The Deſcription and Menſuration of Piramids *and their* Fruſtums, *as tapering Timber, conſiſting of* 3, 4, 5, *or more ſides.*

A *Piramid* is no other way differing from a Cone, than that its Baſe is made of ſtraight lines, conſiſting of ſeveral ſides, deminiſhing equally as a Cone till it end in a point at the Vertex, and if the Baſe

do not consist of some regular Poligon, but that the sides be unequal, it matters not, provided they hold proportionally through, that a right line may be applied from every of the meeting Angles to the Vertex.

The same way is taken in measuring of them as in a Cone, viz. by multiplying the Area of the Base by ⅓ of the length.

Examp. Of a *Piramid* consisting of four equal sides, each side at the base containing 10 foot 5 inches, or 125 inches, which gives the *Area* of the *Base* 15625, then supposing the whole length to contain 25 foot 3 inches, or 303 inches, whereof ⅓ is 101 × 15625 = 1578125 inches for the solid content of the *Piramid*, which divided by 1728 = 913 $\frac{341}{1728}$ feet solid in the *Piramid*.

The Frustums of *Piramids* (such as squared tapering Timber having two *Bases*) when the *Area's* of of the *Bases* are gotten as is taught in the first Chap. of this second *Book*, the Rules is to be observed as in the measuring of the Frustums of Cones, which may save me the labour of an Example here.

This is the right Method in finding the true solidity of tapering Timber consisting of 3, 4, 5, 6, 7, 8, or more equal sides.

PROP. VI.

The Description and Mensuration of Timber, or any other Solid in the form of a Prism.

A *Prism* is a Solid having length, consisting of two *Bases* being equal at both ends, as a square piece of Timber whose breadth and depth are both ends alike, a *Cylinder* also is a round *Prism*. Note also, the *Bases* of *Prisms* may consist of several forms,

as

a Triangle, Quadrangle, Pentagon, Heptagon, or any other Plain where right lines may be applied from one Base to another.

The content of any *Prism* is found by multiplying the *Area* of the *Base* into the length.

Examp. Of a Timber-stick whose *Bases* are exactly square, the side of each square being 20.2 inches, which giveth the Area of either Base 408, which multiplied by 196 inches being the length, or 16 foot 4 inches, gives the solid content in inches 79968, which divided by 1728 gives in the Quotient 46 $\frac{1152}{1728}$ solid feet, in that Timber Log being a square *Prism*.

Logarithmetically.

Side of the Square	20.2	2.305338
Again	20.2	2.305338
Area of either Base	408	2.611070
Length in Inches	196	2.292256
Solid Content in Inches	79968	4.903326
Divisor	1728	3.237754
Content in solid feet	46.29	3.665572

PROP. VII.

The Description and Mensuration of any Solid in form of a Globe or Sphere, and its Frustums.

A Sphere or Globe is a Solid every way Circular, by the motion of a Semi-Circle about its Diameter, being an exact round Solid, such as are the Balls of Free Stone commonly set for finishing of Great Gates before the Front of any Spacious Building; to find the solid content there are several ways,

as first, multiply the Cube of the Diameter or Axe by 11, the Product thence arising, divide by 21, the Quotient is the solid content.

2. Or multiply the Area by one sixth part of the Globes Superficies, the Product is the solid content, or one sixth part of the Diameter multiplied by the Spheres Superficies, gives the same.

3. Otherways find the Area of the Circle equal to the Diameter, and multiply the Area of the said Circle by two thirds of the Diameter, the Product is the solid content; or multiply the Diameter by two thirds of the Circles Area performeth the same.

I. *Example.* Of a Sphere whose Axe is 54.6 Inches, and the circumference 171 5 Inches, the convex Superficies is 9363 9 (as in the first Chapter and seventh Prop.) the Cube of the Axe is 162771 936 = 1790481 which divided by 21 = 85256 solid Inches, which divided by 1728 = 49 $\frac{1848}{1728}$ solid feet.

II. *Example.* One sixth part of 54.6 the *Axe* is 9.1 × 9363.9 = 85212 which divided by 1728 = 49 $\frac{1848}{1728}$ solid feet agreeing nearly with the former.

III. *Ex.* The *Area* of the Circle is 23.1 × 36.4 = 852 2 which divided as before gi eth 49 $\frac{1848}{1728}$ feet exactly agreeing with the former, but the work may be much abreviated in these two last Examples by *Logarithms*, as followeth.

I. *Logarithmetical way.*

$\frac{1}{6}$ of 54.6 the *Axe* is	9.1	—	0.95904
Spheres Superficies —	9363.9	—	5 97 45
	Sum	—	6.93 49
	1728 Divisor	—	3.23754
Spheres Solidity —	49.31 feet	—	3.69295

II. *Loga-*

II. *Logarithmetical way.*

Area of the Circle	2341	3.36939
$\frac{3}{5}$ of the *Axe* 54.6 is	36.4	2.56110
	Sum	5.93049
1728	Divisor	3.23754
Globes solid content 49.31 feet		3.65295

The Frustum of a Sphere or Globe, is a part cut off, whose Base is a circular Plain, and whose solid content may be found by having the Diameter of the whole Sphere, with the Diameter and heighth of the the whole Frustum, then use this *Analogie*.

As the remainder of the *Axe* or Diameter, is to the Frustums heighth So is the Semi-diameter of the whole Sphere to the solid content of the Frustum.

If two Frustums be cut off from a Sphere so, that the Plains of the Bases are Parallel, and that the Solidity of the middle part left is required, it is but finding the content of both Frustums, which subducted out of the whole Globe, leaveth the solidity of the middle or part left.

PROP. VIII.

Of Gauging.

ALl that I here say of *Gauging*, is if a Vessel contained under any of the Descriptions before illustrated, the Solidity in Inches being divided by 282 for Ale, and for VVine by 321 will produce the content in Gallons and parts, according to the number of the Divisor.

In the next place follows Tables, to perform what we have before exemplified, both in Natural and Artificial Arithmatick in Planometry and Stereometry, whose true Content may be found by only inspecting the Tables for that purpose, which is here done for the benefit of those that do not understand Arithmatick, for in this place it is my design to instruct the Ignorant.

A Table of Board Measure.

Length in Feet	Breadth in Inches.								
	5	6	7	8	9	10	11	12	
1	0 4	0 5	0 6	0 7	0 7	0 8	0 9	1 0	
2	0 8	1 0	1 1	1 3	1 5	1 7	1 8	2 0	
3	1 2	1 5	1 7	2 0	2 2	2 5	2 7	3 0	
4	1 7	2 0	2 3	2 7	3 0	3 3	3 7	4 0	
5	2 1	2 5	2 9	3 3	3 7	4 2	4 6	5 0	
6	2 5	3 0	3 5	4 0	4 5	5 0	5 5	6 0	
7	2 9	3 5	4 1	4 7	5 2	5 8	6 4	7 0	
8	3 3	4 0	4 7	5 3	6 0	6 7	7 3	8 0	
9	3 7	4 5	5 2	6 0	6 7	7 5	8 2	9 0	
10	4 2	5 0	5 8	6 7	7 5	8 3	9 2	10 0	
11	4 6	5 5	6 4	7 3	8 2	9 2	10 1	11 0	
12	5 0	6 0	7 0	8 0	9 0	10 0	11 0	12 0	
13	5 4	6 5	7 6	8 7	9 7	10 8	11 9	13 0	
14	5 8	7 0	8 2	9 3	10 5	11 7	12 8	14 0	
15	6 2	7 5	8 7	10 0	11 2	12 5	13 7	15 0	
16	6 7	8 0	9 3	10 7	12 0	13 3	14 7	16 0	
17	7 1	8 5	9 9	11 3	12 7	14 2	15 6	17 0	
18	7 5	9 0	10 5	12 0	13 5	15 0	16 5	18 0	
19	7 9	9 5	11 1	12 7	14 2	15 8	17 4	19 0	
20	8 3	10 0	11 7	13 3	15 0	16 7	18 3	20 0	
21	8 7	10 5	12 2	14 0	15 7	17 5	19 2	21 0	
22	9 2	11 0	12 8	14 7	16 5	18 3	20 2	22 0	
23	9 6	11 5	13 4	15 3	17 2	19 2	21 1	23 0	
24	10 0	12 0	14 0	16 0	18 0	20 0	22 0	24 0	
25	10 4	12 5	14 7	16 7	18 7	20 8	23 9	25 0	
26	10 8	13 0	15 2	17 3	19 5	21 7	23 8	26 0	
27	11 2	13 5	15 7	18 0	20 2	22 5	24 7	27 0	
28	11 7	14 0	16 3	18 7	21 0	23 3	25 7	28 0	
29	12 1	14 5	16 9	19 3	21 7	24 2	26 6	29 0	
30	12 5	15 0	17 1	20 0	22 5	25 0	27 5	30 0	

A Table of Board Measure.

Length in Feet.	Breadth in Inches.																			
	13		14		15		16		17		18		19		20					
1	1	1	1	2	1	2	1	3	1	4	1	5	1	6	1	7				
2	2	2	2	3	2	5	2	7	2	8	3	0	3	2	3	3				
3	3	2	3	5	3	7	4	0	4	2	4	5	4	7	5	0				
4	4	3	4	7	5	0	5	3	5	7	6	0	6	3	6	7				
5	5	4	5	8	6	2	6	7	7	1	7	5	7	9	8	8				
6	6	5	7	0	7	5	8	0	8	5	9	0	9	5	10	0				
7	7	6	8	2	8	7	9	3	9	9	10	5	11	1	11	7				
8	8	7	9	3	10	0	10	7	11	3	12	0	12	7	13	3				
9	9	7	10	5	11	2	12	0	12	7	13	5	14	2	15	0				
10	10	8	11	7	12	5	13	3	14	2	15	0	15	8	16	7				
11	11	9	12	8	13	7	14	7	15	6	16	5	17	5	18	3				
12	13	0	14	0	15	0	16	0	17	5	18	0	19	0	20	0				
13	14	1	15	2	16	2	17	3	18	4	19	5	20	6	21	7				
14	15	2	16	3	17	5	18	7	19	8	21	0	22	2	23	3				
15	16	2	17	5	18	7	20	0	21	2	22	5	23	7	25	0				
16	17	3	18	7	20	0	21	3	22	7	24	0	25	3	26	7				
17	18	4	19	8	21	2	22	7	24	1	25	5	26	9	28	3				
18	19	5	21	0	22	5	24	0	25	5	27	0	28	5	30	0				
19	20	6	22	2	23	7	25	3	26	9	28	5	30	1	31	7				
20	21	7	23	3	25	0	26	7	28	3	30	0	31	7	33	3				
21	22	7	24	5	26	2	28	0	29	7	31	5	33	2	35	0				
22	23	8	25	7	27	5	29	3	31	2	33	0	34	8	36	7				
23	24	9	26	8	28	7	30	7	32	6	34	5	36	4	38	3				
24	26	0	28	0	30	0	32	0	34	0	36	0	38	0	40	0				
25	27	1	29	2	31	2	33	3	35	4	37	5	39	6	41	7				
26	28	2	30	3	32	5	34	7	36	8	39	0	41	2	43	5				
27	29	2	31	5	33	7	36	0	38	2	40	5	42	7	45	0				
28	30	3	32	7	35	0	37	3	39	7	42	0	44	3	46	7				
29	31	4	33	8	36	3	38	7	41	1	43	5	45	9	48	3				
30	32	5	35	0	37	5	40	0	42	5	45	0	47	5	50	0				

A Table of Board Measure.

Breadth in Inches.

Length in Feet.	21	22	23	24	25	26	27	28
1	1	1 8	1 9	2 0	2 1	2 2	2 3	2 3
2	3 5	3 7	3 8	4 0	4 2	4 3	4 5	4 7
3	5 2	5 5	5 7	6 0	6 2	6 5	6 7	7 0
4	7 0	7 3	7 7	8 0	8 3	8 7	9 0	9 3
5	8 7	9 2	9 6	10 0	10 4	10 8	11 2	11 7
6	10 5	11 0	11 5	12 0	12 5	13 0	13 5	14 0
7	12 2	12 8	13 4	14 0	14 7	15 2	15 7	16 3
8	14 0	14 7	15 3	16 0	16 7	17 3	18 0	18 7
9	15 7	16 5	17 2	18 0	18 7	19 5	20 2	21 0
10	17 5	18 3	19 2	20 0	20 8	21 7	22 5	23 3
11	19 2	20 2	21 1	22 0	22 9	23 8	24 7	25 7
12	21 0	22 0	23 0	24 0	25 0	26 0	27 0	28 0
13	22 7	23 8	24 9	26 0	27 1	28 2	29 2	30 3
14	24 5	25 7	26 8	28 0	29 2	30 3	31 5	32 7
15	26 2	27 5	28 7	30 0	31 2	32 5	33 7	35 0
16	28 0	29 3	30 7	32 0	33 3	34 7	36 0	37 3
17	29 7	31 2	32 6	34 0	35 4	36 8	38 2	39 7
18	31 5	33 0	34 5	36 0	37 5	39 0	40 5	42 0
19	33 2	34 8	36 4	38 0	39 6	41 2	42 7	44 3
20	35 0	36 7	38 3	40 0	41 7	43 3	45 0	46 7
21	36 7	38 5	40 2	42 0	43 7	45 5	47 2	49 0
22	38 5	40 3	42 2	44 0	45 8	47 7	49 5	51 3
23	40 2	42 2	44 1	46 0	47 9	49 8	51 7	53 7
24	42 0	44 0	46 0	48 0	50 0	52 0	54 0	56 0
25	43 7	45 8	47 9	50 0	52 1	54 2	56 2	58 3
26	45 5	47 7	49 8	52 0	54 2	56 3	58 5	60 7
27	47 2	49 5	51 7	54 0	56 2	58 5	60 7	63 0
28	49 0	51 3	53 7	56 0	58 3	60 7	63 0	65 3
29	50 7	53 2	55 9	58 0	60 4	62 8	65 2	67 7
30	52 5	55 0	57 5	60 0	62 5	65 0	67 5	70 0

A Table of Board Measure.

Length in feet	Breadth in Inches.																							
	29		30		31		32		33		34		35		36									
1	2	4	2	5	2	6	2	7	2	7	2	8	2	9	3	0								
2	4	8	5	0	5	2	5	3	5	5	5	7	5	8	6	0								
3	7	2	7	5	7	7	8	0	8	2	8	5	8	7	9	0								
4	9	7	10	0	10	3	10	7	11	0	11	3	11	7	12	0								
5	12	1	12	5	12	9	13	3	13	7	14	2	14	6	15	0								
6	14	5	15	0	15	5	16	0	16	5	17	0	17	5	18	0								
7	16	9	17	5	18	1	18	7	19	2	19	8	20	4	21	0								
8	19	3	20	0	20	7	21	3	22	0	22	7	23	3	24	0								
9	21	7	22	5	23	2	24	0	24	7	25	5	26	2	27	0								
10	24	2	25	0	25	8	26	7	27	5	28	3	29	2	30	0								
11	26	6	27	5	28	4	29	3	30	2	31	2	32	1	33	0								
12	29	0	30	0	31	0	32	0	33	0	34	0	35	0	36	0								
13	31	4	32	5	33	5	34	7	35	7	36	8	37	9	39	0								
14	33	8	35	0	36	2	37	3	38	5	39	7	40	8	42	0								
15	36	2	37	5	38	7	40	0	41	2	42	5	43	7	45	0								
16	38	7	40	0	41	3	42	7	44	0	45	3	46	7	48	0								
17	41	1	42	5	43	9	45	3	46	7	48	2	49	6	51	0								
18	43	5	45	0	46	5	48	0	49	5	51	0	52	5	54	0								
19	45	9	47	5	49	1	50	7	52	2	53	8	55	4	57	0								
20	48	3	50	0	51	7	53	3	55	0	56	7	58	3	60	0								
21	50	7	52	5	54	2	56	0	57	7	59	5	61	2	63	0								
22	53	2	55	0	56	8	58	7	60	5	62	3	64	2	66	0								
23	55	6	57	5	59	4	61	3	63	2	65	2	67	1	69	0								
24	58	0	60	0	62	0	64	0	66	0	68	0	70	0	72	0								
25	60	4	62	5	64	6	66	7	68	7	70	8	72	9	75	0								
26	62	8	65	0	67	2	69	3	71	5	73	7	75	8	78	0								
27	65	2	67	5	69	7	72	0	74	2	76	5	78	7	81	0								
28	67	7	70	0	72	3	74	7	77	0	79	3	81	7	84	0								
29	80	1	72	5	74	9	77	3	09	7	82	2	84	6	87	0								
30	72	5	75	0	77	5	80	0	82	5	85	0	87	5	90	0								

Another Table of Board measure, in which find the Breadth in Feet and Parts, which multiply by the number against which it ſtands, the Product (cutting off three Figures towards the right hand) is the Content in Feet, and the three figures cut off are parts of a Foot.

Brea.	F. Pa.	Brea.	F. Pa.	Brea.	F. Pa.	Brea.	F. Pa.
1 0	0 083	9 1	0.770	2	1 458	3	2.146
1	0.107	2	0.791	3	1.479	26 0	2.167
2	0.125	3	0.812	18 0	1.500	1	2.187
3	0.145	10 0	0.833	1	1.521	2	2 208
2 0	0 166	1	0.854	2	1.542	3	2.229
1	0 187	2	0.875	3	1 562	27 0	2.250
2	0.208	3	0.897	19 0	1.583	1	2.270
3	0.229	11 0	0.917	1	1 604	2	2 291
3 0	0.250	1	0.937	2	1.625	3	2.332
1	0.170	2	0.958	3	1.646	28 0	2.333
2	0.291	3	0.979	20 0	1.667	1	2 354
3	0.312	12 0	1 000	1	1.687	2	2.375
4 0	0.333	1	1.027	2	1.708	3	2.393
1	0.354	2	1.044	3	1 729	29 0	2.417
2	0.375	3	1.062	21 0	1.750	1	2.437
3	0.396	13 0	1.083	1	1 770	2	2 458
5 0	0.417	1	1.104	2	1.791	3	2.479
1	0 437	2	1.125	3	1.812	30 0	2 500
2	0 458	3	1.146	22 0	1 833	1	2.521
3	0.479	14 0	1.167	1	1.854	2	2.542
6 0	0 500	1	1 1 7	2	1.875	3	2.562
1	0.521	2	1.208	3	1 896	31 0	2.583
2	0.542	3	1.229	23 0	1 917	1	2.604
3	0.562	15 0	1.250	1	1.937	2	2 625
7 0	0.583	1	1.270	2	1.958	3	2.646
1	0.604	2	1.291	3	1.979	32 0	2.667
2	0.625	3	1.312	24 0	2.000	1	2 687
3	0.646	16 0	1.333	1	2 021	2	2,708
8 0	0 667	1	1.354	2	2.041	3	2.729
1	0 687	2	1.375	3	2.062	33 0	2.750
2	0.707	3	1 396	25 0	2.083	1	2.770
3	0.729	17 0	1.417	1	2.104	2	2 791
9 0	0.750	1	1.437	2	2.125	3	2.812

A Table of Diameters and Circumferences, with the Area's of Circles Corresponding.

Diam.	Circum.	Area.	Diam.	Circum.	Area.	Diam.	Circum.	Area.
(1)	3.1	0.75	.6	23.8	45.22	.2	44.6	158.33
.2	3.8	1.14	.8	24.5	48.16	.4	45.2	162.72
.4	4.4	1 54	(8)	25.1	50.20	6	45.8	167.17
.6	5.0	2.00	.2	25.8	52.89	.8	46.5	172.05
.8	5.6	2.52	.4	26.4	55.44	(15)	47.1	176.62
(2)	6.3	3.60	.6	27.0	58.05	.2	47.7	181.26
.2	7.0	3.85	.8	27.6	60.72	.4	48.4	186.34
.4	7.5	4.04	(9)	28.3	63.67	.6	49.0	191.10
.6	8 2	5.33	.2	28.9	66.47	.8	49.6	195.92
8	8.8	6 16	.4	29.5	69.32	(16)	50.2	200.80
(3)	9.4	7,05	.6	30.1	72.24	.2	50.9	206.14
.2	10.0	8.00	.8	30.8	75.46	.4	51.5	211.85
.4	10.7	9.09	(10)	31.4	78.50	.6	52.2	216.63
.6	11.3	10.17	.2	32.0	81.60	.8	52.8	221.76
.8	12.0	11.40	.4	32.7	85.02	(17)	53.4	226.95
(4)	12.6	12.60	.6	33.3	88.24	.2	54.0	232.20
.2	13.2	13.86	.8	33.9	91.53	.4	54.6	237.51
.4	13.8	15 18	(11)	34.6	95.15	.6	55.2	242.88
.6	14.4	16.56	.2	35.2	98.56	8	55.9	248.31
.8	15.0	18.00	.4	35 8	102.01	(18)	56.5	254.25
(5)	15.7	19.62	6	36.4	105.56	.2	57.2	260.26
.2	16.3	21.19	.8	37.0	109.15	.4	57.8	265.88
.4	17.0	22.95	(12)	37.7	113 10	.6	58.4	270.56
.6	17.6	24.64	.2	38.3	116.81	.8	59.1	277.30
.8	18.2	26.39	.4	39 0	120.90	(19)	59.7	283.10
(6)	18.8	28.20	.6	39.6	124.74	.2	60.3	289.44
.2	19.5	30.22	.8	40.2	128.64	.4	60.9	295.36
.4	20.0	32.00	(13)	40.8	132.60	.6	61.6	301.84
.6	20.7	34.15	.2	41.4	136.62	.8	62.2	307.89
.8	21.3	36.21	.4	42.0	140.70	(20)	62.8	314.00
(7)	22.0	38.50	.6	42.7	145.18	.2	63.4	320.17
.2	22.6	40.68	.8	43.3	149.38	.4	64.0	326.40
.4	23.2	42.92	(14)	44.0	154.00	.6	64.7	333.20

A Table of Diameters and Circumferences, with the Area's of Circles Correſponding.

Diam.	Circ.	Area.	Diam.	Circ.	Area.	Diam.	Circ.	Area.
.8	65.3	339.56	.4	86.1	589.78	(34)	106 8	907 8
(21)	65.9	345.97	.6	86.7	598 23	.2	107.4	918.27
.2	66 6	352.98	.8	87.3	606.74	.4	108.0	928.80
.4	67.2	359.52	(28)	88.0	616.00	.6	108.7	940.25
.6	67.8	366.12	.2	88.6	624.63	.8	109.3	950 91
.8	68 5	373.32	.4	89.2	633.32	(35)	109.9	961 62
(22)	69.1	380.05	.6	89.8	642.07	.2	110 6	973.21
.2	69.7	386.83	.8	90.5	651.50	4	111.2	984.1
.4	70.4	394.24	(29)	91.1	660.47	6	111.8	995.02
.6	71.0	401.15	.2	91.7	669.41	.8	112.4	1005.91
.8	71.6	408.12	.4	92.3	678.40	(36)	113.1	1017.00
(23)	72.2	415.15	.6	93.0	688.20	.2	113.7	1028.08
.2	72.9	422.82	.8	93.6	697.32	.4	114.3	1039.22
.4	73.5	429 97	(30)	94.2	706.50	.6	114.9	1051.33
.6	74.1	437.19	.2	94.9	716.4	.8	115.6	1063.52
.8	74.8	445.06	.4	95.5	725.80	(37)	116.2	1074.85
(24)	75 4	452.40	.6	96.1	735.16	.2	116.8	1086.24
.2	76.0	459.80	.8	96.7	744.59	.4	117.5	1098.62
.4	766	467.26	(31)	97.4	754.85	.6	118.1	1110.14
.6	77 3	475 39	.2	98.0	764.40	.8	118 7	1121.71
.8	78.0	483.60	.4	98.6	774.01	(38)	119.3	1133.35
(25)	78.5	490.62	.6	99.2	783.68	.2	120.0	1145.58
.2	79.1	498.33	.8	99.9	792.41	.4	120.6	1157.76
.4	79.8	506.73	(32)	100.5	804 00	.6	121 2	1169.58
6.	80.4	5 4.56	.2	101.1	813.85	.8	121.8	1181 46
.8	81.0	522 45	.4	101.8	824.58	(39)	122.5	1194.37
(26)	81.6	530 40	.6	102.4	834.16	.2	123.1	1206.38
.2	82.3	539.06	.8	103.0	844 60	.4	123.7	1218.44
.4	82.9	546.74	(33)	103.6	854.76	.6	124.4	1231.56
.6	83 5	555.27	.2	104.3	865.69	.8	125.0	1243.75
.8	84.2	564.14	.4	104.9	875.91	(40)	125.6	1256.00
(27)	84.8	572.40	.6	105.5	886.20	.2	126.3	1269.31
.2	85.4	580.72	.8	106.2	897.39	.4	126.9	1281.69

A Table of Diameters and Circumferences, with the Area's of Circles Correſponding.

Diam.	Circ.	Area.	Diam.	Circ.	Area.	Diam.	Circ.	Area.
.6	127 5	1294 12	.2	148 2	1748.76	.8	169.0	2273.05
.8	128.1	1307.62	.4	148.8	1763.28	(54)	169.6	2289.60
(41)	128.8	1320.20	.6	149.5	1779.05	.2	170.2	2306.21
2.	129.4	1332.82	8	150.1	1794.72	.4	170.8	2322 88
.4	130.0	1345.50	(48)	150.7	1808.40	.6	171.5	2340.97
.6	130.6	1358 24	.2	151.4	1824.37	.8	172.1	2357.77
.8	131.3	1372.08	.4	152.0	1839.20	(55)	172.8	2375.00
(42)	131.9	1384.95	.6	152.6	1854.09	.2	173.4	2392.92
.2	132.5	1397 87	8	153.3	1870.26	.4	174.0	2409.90
.4	133 2	1411.92	(49)	153.5	1885.27	.6	174.6	2426.94
.6	133.8	14 4.97	.2	154 5	1900 35	.8	175.2	2444.04
8	134.4	1438.08	.4	155.2	1916.72	(56)	175 8	2461.20
(43)	135.0	1451.25	.6	155.8	1931.92	.2	176.4	2478.42
.2	135 7	1466.56	.8	156.4	1947.18	.4	177.1	2497.10
.4	136.3	1478.85	(50)	157 0	1962.50	6.	177.8	2515.87
.6	136 9	1492.21	.2	157 7	1977.88	.8	178.4	2533.28
.8	137 6	1506.72	.4	158.3	1994.58	(57)	179 0	2548.75
(44)	138.2	1520.2	.6	158.9	2010.08	.2	179.6	2568.28
2	138.8	1533 74	.8	159.	2025.65	.4	180.2	2585.87
4	139 4	1547 34	(51)	160.1	2040.00	.6	180 8	2603.52
.6	140.0	1561.00	.2	160.8	2058.24	.8	181.5	2622.67
.8	140.7	1575.81	.4	161	2073.99	(58)	182.1	2640.45
(45)	141.2	1589 62	.6	162.	2089.80	.2	182.8	2659.74
.2	141 9	1604.47	.8	162	2105.67	.4	183.4	2677.64
.4	142.6	1618.51	(52)	163.3	2122.90	.6	184.0	2695.60
.6	143.2	1632.48	.2	163.9	2138 89	.8	184.6	2713.62
.8	143.8	1646.51	.4	164.6	2156.26	(59)	185.3	2733.17
(46)	144.5	1661 73	6	165.2	2172.38	.2	185.9	2751.32
.2	145.0	1674.75	.8	165.8	2188.56	.4	186.6	2771.01
.4	145 7	1690.12	(53)	166.4	2204.80	.6	187.2	2721.28
.6	146.4	1705.56	.2	167.1	2222.43	.8	187.8	2807.61
.8	147.0	1719.90	.4	167.8	2240.13	(60)	188.4	2816.00
(47)	147.6	1734.30	.6	168.4	2256.56	.2	189.0	3843.45

A Table shewing the Area of Right-line Figures, as Squares, Triangles, and Trapezia's.

Inch.	30		31		32		33		34		35		36	
	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.
30	6	25	6	47	6	68	6	89	7	08	7	29	7	50
40	8	34	8	61	8	71	9	17	9	45	9	73	10	00
50	10	42	10	77	11	12	11	47	11	82	12	15	12	50
60	12	50	12	92	13	35	13	76	14	17	14	59	15	00
70	14	58	15	07	15	56	16	05	16	55	17	01	17	50
80	16	67	17	22	17	78	18	35	18	90	19	45	20	00
90	18	75	19	38	20	00	20	63	21	26	21	89	22	50
100	20	84	21	55	22	22	22	92	23	62	24	31	24	00
1	0	21	0	21	0	22	0	23	0	24	0	25	0	25
2	0	4	0	43	0	45	0	46	0	48	0	49	0	50
3	0	63	0	65	0	68	0	69	0	71	0	74	0	75
4	0	84	0	87	0	91	0	92	0	95	0	98	1	00
5	1	05	1	08	1	12	1	15	1	19	1	22	1	25
6	1	26	1	29	1	38	1	38	1	42	1	46	1	50
7	1	47	1	51	1	56	1	62	1	66	1	70	1	75
8	1	68	1	73	1	78	1	84	1	90	1	00	2	00
9	1	89	2	95	2	00	2	06	2	13	2	20	2	25

Inch.	37		38		39		40		41		42		43	
	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.
30	7	71	7	92	8	13	8	34	8	55	8	76	8	97
40	10	28	10	56	10	84	11	12	11	40	11	68	11	96
50	12	85	13	20	13	55	13	90	14	24	14	59	14	94
60	15	42	15	84	16	26	16	68	17	08	17	50	17	92
70	17	99	18	48	18	97	19	45	19	95	20	42	20	91
80	20	56	21	12	21	68	22	22	22	78	23	34	23	90
90	23	13	23	76	24	38	25	00	25	26	26	25	26	89
100	25	70	26	40	27	08	27	78	28	48	29	19	29	87
1	0	26	0	27	0	28	0	28	0	29	0	29	0	30
2	0	52	0	54	0	55	0	56	0	57	0	59	0	60
3	0	77	0	80	0	82	0	84	0	86	0	88	0	90
4	1	03	1	07	1	08	1	11	1	14	1	17	1	20
5	1	28	1	35	1	35	1	39	1	42	1	46	1	49
6	1	55	1	59	1	63	1	67	1	71	1	76	1	79
7	1	81	1	85	1	89	1	95	1	99	2	04	2	09
8	2	07	2	11	2	17	2	22	2	28	2	34	2	39
9	2	32	2	38	2	44	2	50	2	56	2	63	2	69

A Table shewing the Area of Right-line Figures, as Squares, Triangles, and Trapezia's.

Inch.	44		45		46		47		48		49		50	
	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.
30	9	17	9	38	9	59	9	80	10	00	10	21	10	42
40	12	35	12	50	12	78	13	05	13	32	13	60	13	88
50	15	28	15	63	15	98	16	32	16	67	17	01	17	36
60	18	33	18	76	19	17	19	59	20	00	20	42	20	84
70	21	60	21	89	22	36	22	85	23	32	23	81	24	31
80	24	73	25	00	25	56	26	07	26	67	27	22	27	78
90	27	50	28	13	28	75	29	39	30	00	30	63	31	25
100	30	56	31	25	31	95	32	64	33	32	34	03	34	74
1	0	31	0	32	0	33	0	34	0	35	0	35	0	35
2	0	62	0	63	0	64	0	66	0	68	0	69	0	70
3	0	92	0	95	0	99	0	98	1	00	1	02	1	05
4	1	22	1	26	1	28	1	31	1	33	1	36	1	40
5	1	53	1	57	1	60	1	63	1	67	1	70	1	74
6	1	84	1	88	1	92	1	96	2	00	2	04	2	08
7	2	14	2	19	2	24	2	43	2	32	2	38	2	43
8	2	45	2	50	2	56	2	62	2	67	2	73	2	78
9	2	75	2	82	2	88	2	95	3	00	3	06	3	13

Inch.	51		52		53		54		55		56		57	
	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.
30	10	63	10	84	11	05	11	25	11	46	11	67	11	88
40	14	17	14	45	14	73	15	00	15	28	15	56	15	84
50	17	71	18	06	18	41	18	76	19	10	19	45	19	80
60	21	25	21	67	22	08	22	50	22	92	23	34	23	76
70	24	80	25	28	25	77	25	56	26	74	27	22	27	72
80	28	34	28	89	29	45	30	00	30	56	31	11	31	68
90	31	88	32	50	33	13	33	75	34	38	35	00	35	63
100	35	28	36	11	36	82	37	35	38	20	38	89	39	59
1	0	35	0	36	0	37	0	38	0	38	0	39	0	40
2	0	71	0	73	0	74	0	76	0	77	0	78	0	80
3	1	06	1	08	1	10	1	13	1	14	1	17	1	19
4	1	42	1	45	1	48	1	50	1	53	1	56	1	59
5	1	77	1	81	1	84	1	88	1	91	1	95	1	98
6	2	13	2	17	2	21	2	25	2	29	2	34	2	38
7	2	49	2	53	2	58	2	63	2	68	2	73	2	77
8	2	84	2	90	2	95	3	00	3	06	3	11	3	17
9	3	19	3	25	3	32	3	38	3	44	3	50	3	56

A Table shewing the Area of Right-line Figures, as Squares, Triangles, and Trapezia's.

Inch.	58		59		60		61		62		63		64	
	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.
30	12	08	12	29	12	50	12	71	12	92	13	13	13	34
40	16	11	16	39	16	67	16	96	17	22	17	50	17	78
50	20	14	20	49	20	84	21	18	21	53	21	88	22	22
60	24	17	24	59	25	00	25	42	25	84	26	25	26	67
70	28	20	28	69	29	17	29	66	30	14	30	63	31	11
80	33	22	32	78	33	34	33	20	34	45	35	00	35	56
90	36	25	36	88	37	50	37	45	38	76	39	38	40	00
100	40	28	40	98	41	67	42	36	43	06	43	76	44	43
1	0	42	0	42	0	42	0	42	0	43	0	44	0	45
2	0	81	0	83	0	84	0	04	0	87	0	88	0	90
3	1	21	1	23	1	25	1	21	1	24	1	31	1	34
4	1	62	1	64	1	67	1	70	1	80	1	76	1	78
5	2	01	2	05	2	08	2	12	2	15	2	19	2	22
6	2	42	2	46	2	50	2	55	2	60	2	63	2	67
7	2	83	2	87	2	92	2	98	3	01	3	07	3	11
8	3	22	3	28	3	34	3	39	3	45	3	50	3	56
9	3	63	4	70	3	76	3	83	3	88	3	94	4	00

Inch.	65		66		67		68		69		70		71	
	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.
30	13	55	13	76	13	97	14	17	14	38	14	59	14	80
40	18	06	18	34	18	62	18	90	19	17	19	45	19	73
50	22	57	22	92	23	27	23	62	23	98	23	31	24	67
60	27	08	27	50	27	92	28	34	28	76	29	17	29	59
70	31	60	32	08	32	57	33	06	33	55	33	48	34	52
80	36	11	36	67	37	22	37	78	38	34	38	90	39	45
90	40	62	41	25	41	88	42	50	43	13	43	76	44	38
100	45	14	45	84	46	53	47	22	47	92	48	62	49	31
1	0	45	0	46	0	47	0	48	0	49	0	49	0	50
2	0	91	0	92	0	94	0	95	0	97	0	98	0	99
3	1	35	1	38	1	40	1	42	1	37	1	46	1	49
4	1	81	1	84	1	87	1	90	1	92	1	95	1	99
5	2	26	2	29	2	33	2	36	2	40	2	43	2	47
6	2	71	2	76	2	80	2	84	2	88	2	92	2	97
7	3	16	3	21	3	26	3	31	3	35	3	41	3	46
8	3	62	3	67	3	73	3	78	3	84	3	90	3	96
9	4	07	4	13	4	19	4	25	4	31	4	38	4	44

A Table shewing the Area of Right-line Figures, as Squares, Triangles, and Trapezia's.

Inch.	72		73		74		75		76		77		78	
	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.
30	15	0	15	21	15	42	15	63	15	84	16	5	16	25
40	20	0	20	28	20	56	20	84	21	11	21	39	21	67
50	25	0	25	35	25	70	26	5	26	39	26	75	27	8
60	30	0	30	42	30	84	31	26	31	67	32	8	32	50
70	35	0	35	49	35	98	36	47	36	95	37	43	37	99
80	40	0	40	56	41	12	41	68	42	22	42	78	43	34
90	45	0	45	63	46	26	46	89	47	50	47	43	48	76
100	50	0	50	70	51	40	52	10	52	78	53	48	54	17
1	0	50	0	50	0	51	0	52	0	53	0	54	0	55
2	1	0	1	1	1	3	1	5	1	6	1	7	1	8
3	1	50	1	53	1	55	1	57	1	58	1	60	1	63
4	2	0	2	4	2	6	2	8	2	11	2	14	2	17
5	2	50	2	54	2	57	2	61	2	64	2	68	2	71
6	3	0	3	4	3	8	3	11	3	16	3	21	3	25
7	3	50	3	56	3	59	3	64	3	70	3	75	3	80
8	4	0	4	6	4	11	4	17	4	22	4	28	4	18
9	4	50	4	56	4	63	4	70	4	75	4	82	4	88

Inch.	79		80		81		82		83		84		85	
	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.
30	16	46	16	67	16	88	17	8	17	29	17	50	17	71
40	21	95	22	22	22	50	22	78	23	6	23	34	23	62
50	27	43	27	78	28	11	28	48	28	81	29	17	29	52
60	32	92	33	32	33	76	34	17	34	59	25	0	35	42
70	38	39	38	88	38	69	39	87	40	28	40	84	41	52
80	43	88	44	45	45	0	45	56	46	11	46	67	47	22
90	49	38	50	0	50	63	51	25	51	88	52	50	53	13
100	54	87	55	56	56	24	56	95	57	64	58	34	59	3
1	0	56	0	56	0	57	0	58	0	59	0	59	0	60
2	1	10	1	12	1	13	1	84	1	16	1	15	1	19
3	1	65	1	68	1	70	1	72	1	74	1	77	1	78
4	2	20	2	23	2	25	2	28	2	31	2	34	2	37
5	2	75	2	79	2	82	2	86	2	90	2	93	2	96
6	3	30	3	34	3	38	3	42	3	47	3	50	3	55
7	3	85	3	90	3	95	3	99	4	4	4	9	4	13
8	4	40	4	45	4	50	4	36	4	62	4	68	4	73
9	4	95	5	•	5	6	5	13	5	19	5	26	5	32

A Table shewing the Area of Right-line Figures, as Squares, Triangles, and Trapezia's.

Inch.	86		87		88		89		90		91		92	
	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P
30	17	92	18	13	18	34	18	55	18	75	18	96	19	17
40	23	90	24	17	24	45	24	73	25	0	25	28	25	56
50	29	87	30	21	30	56	30	84	31	25	31	60	31	95
60	35	84	36	25	36	67	37	9	37	50	37	23	38	34
70	41	81	42	30	42	79	43	27	43	75	44	24	44	73
80	47	79	48	34	48	90	49	45	50	0	50	56	51	11
90	53	76	54	38	55	0	55	63	56	25	56	88	57	50
100	59	73	60	42	61	11	61	81	62	50	63	20	63	90
1	0	60	0	61	0	62	0	63	0	63	0	64	0	65
2	1	20	1	21	1	23	1	24	1	25	1	27	1	28
3	1	89	1	82	1	84	1	86	1	88	1	90	1	93
4	2	39	2	42	2	45	2	48	2	50	2	53	2	56
5	2	99	3	3	3	6	3	10	3	13	3	16	3	20
6	3	63	3	63	3	67	3	72	3	75	3	80	3	84
7	4	18	4	23	4	28	4	33	4	38	4	43	4	48
8	4	79	4	84	4	90	4	95	5	0	5	6	5	11
9	5	38	5	85	5	50	5	57	5	63	5	69	5	57

Inch.	93		94		95		96		97		98		99	
	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.
30	19	38	19	59	19	80	20	0	20	21	20	42	20	63
40	25	84	26	11	26	30	26	67	26	95	27	23	27	50
50	32	30	32	65	32	99	33	34	33	69	34	3	34	38
60	38	76	39	17	39	59	40	0	40	42	40	84	41	25
70	45	21	45	70	46	19	46	67	47	16	47	65	48	13
80	51	68	52	23	52	79	53	34	53	90	54	45	55	0
90	58	13	58	76	59	38	60	0	60	63	61	25	61	88
100	64	59	65	28	65	98	66	67	67	36	68	6	68	75
1	0	65	0	66	0	67	0	67	0	68	0	69	0	70
2	1	31	1	31	1	32	1	33	1	35	1	37	1	38
3	1	94	1	97	1	99	2	0	2	2	2	4	2	7
4	2	59	2	62	2	65	2	67	2	70	2	73	2	76
5	3	23	3	27	3	30	3	33	3	37	3	41	3	45
6	3	88	3	92	3	97	4	0	4	4	4	9	4	14
7	4	54	4	58	4	63	4	67	4	72	4	77	4	82
8	5	17	5	23	5	28	5	33	5	39	5	45	5	50
9	5	82	5	88	5	94	6	0	6	6	6	13	6	18

A

A Table of Rood-Measure.

Heighth or Depth in Feet.

Length in Feet.	1			2			3			4			5		
	R.	Y.	F.	R.	Y.	F.	R.	Y.	F.	R.	Y.	F.	R.	Y.	F.
1	0	0	1	0	0	2	0	0	3	0	0	4	0	0	5
2	0	0	2	0	0	4	0	0	6	0	0	8	0	1	1
3	0	0	3	0	0	6	0	1	0	0	1	3	0	1	6
4	0	0	4	0	0	8	0	1	3	0	1	7	0	2	2
5	0	0	5	0	1	1	0	1	6	0	2	2	0	2	7
6	0	0	6	0	1	3	0	2	0	0	2	6	0	4	3
7	0	0	7	0	1	5	0	2	3	0	3	1	0	3	8
8	0	0	8	0	1	7	0	2	6	0	3	5	0	4	4
9	0	1	0	0	2	0	0	3	0	0	4	0	0	5	0
10	0	1	1	0	2	2	0	3	3	0	4	4	0	5	5
20	0	2	2	0	4	4	0	6	6	0	8	8	0	11	1
30	0	3	3	0	6	6	0	10	0	0	13	3	0	16	6
40	0	4	4	0	8	8	0	13	3	0	17	7	0	22	2
50	0	5	5	0	11	1	0	16	6	0	22	2	0	27	7
60	0	6	6	0	13	3	0	20	0	0	26	6	0	33	3
70	0	7	7	0	15	5	0	23	3	0	31	1	1	2	8
80	0	8	8	0	17	7	0	26	6	0	35	5	1	8	4
90	0	10	0	0	20	0	0	30	0	1	4	0	1	14	0
100	0	11	1	0	22	2	0	33	3	1	8	4	1	19	5
110	0	12	2	0	24	4	1	0	6	1	12	8	1	25	1
120	0	13	3	0	26	6	1	4	0	1	17	3	1	30	6
130	0	14	4	0	28	8	1	7	3	1	21	7	2	0	2
140	0	15	5	0	31	1	1	10	6	1	26	2	2	5	7
150	0	16	6	0	33	3	1	14	0	1	30	6	2	11	3
160	0	17	7	0	35	6	1	17	3	1	35	1	2	16	8
170	0	18	8	1	1	7	1	20	6	2	3	5	2	22	4
180	0	20	0	1	4	0	1	24	0	2	8	0	2	28	0
190	0	21	1	1	6	2	1	27	3	2	12	4	2	33	5
200	0	22	2	1	8	4	1	30	6	2	16	8	3	3	1
210	0	23	3	1	10	6	1	34	0	2	21	3	3	8	6
220	0	24	4	1	12	8	2	1	3	2	25	7	3	14	2
230	0	25	5	1	15	1	2	4	6	2	30	2	3	19	7
240	0	26	6	1	17	3	2	8	0	2	34	6	3	25	3
250	0	27	7	1	19	5	2	11	3	3	3	1	3	30	8

A Table of Rood-Measure,

Heighth or Depth in Feet.

Length in Feet.	6			7			8			9			10		
	R.	Y.	F.	R.	Y.	F.	R.	Y.	F.	R.	Y.	F.	R.	Y.	F.
1	0	0	6	0	0	7	0	0	8	0	1	0	0	1	1
2	0	1	3	0	1	5	0	1	7	0	2	0	0	2	2
3	0	2	0	0	2	3	0	2	6	0	3	0	0	3	3
4	0	2	6	0	3	1	0	3	5	0	4	0	0	4	4
5	0	3	3	0	3	8	0	4	4	0	5	0	0	5	5
6	0	4	0	0	4	6	0	5	3	0	6	0	0	6	6
7	0	4	6	0	5	4	0	6	2	0	7	0	0	7	7
8	0	5	3	0	6	2	0	7	1	0	8	0	0	8	8
9	0	6	0	0	7	0	0	8	0	0	9	0	0	10	0
10	0	6	6	0	7	7	0	8	8	0	10	0	0	11	1
20	0	13	3	0	15	5	0	17	7	0	20	0	0	22	2
30	0	20	0	0	23	3	0	26	6	0	30	0	0	33	3
40	0	26	6	0	31	1	0	35	5	1	4	0	1	8	4
50	0	33	3	1	2	8	1	8	4	1	14	0	1	19	5
60	1	4	0	1	10	6	1	17	3	1	24	0	1	30	6
70	1	10	6	1	18	4	1	26	2	1	34	0	2	5	7
80	1	17	3	1	26	2	1	35	1	2	0	0	2	16	8
90	1	24	0	1	34	0	2	8	0	2	18	0	2	28	0
100	1	30	6	2	5	7	2	16	8	2	28	0	3	3	1
110	2	1	3	2	13	5	2	25	7	3	2	0	3	14	2
120	2	8	0	2	21	3	2	34	6	3	12	0	3	25	3
130	2	14	6	2	29	1	3	7	5	3	22	0	4	0	4
140	2	21	3	3	0	8	3	16	4	3	32	0	4	11	5
150	2	28	0	3	8	6	3	25	3	4	6	0	4	22	6
160	2	54	6	3	16	4	3	34	2	4	16	0	4	33	7
170	3	5	3	3	24	2	4	7	1	4	26	0	5	8	8
180	3	12	0	3	32	0	4	16	0	5	0	0	5	20	0
190	3	18	6	4	3	7	4	24	8	5	10	0	5	31	1
200	3	25	3	4	11	5	4	33	7	5	20	0	6	6	2
210	3	32	0	4	19	3	5	6	6	5	30	0	6	17	3
220	4	2	6	4	27	1	5	15	5	6	4	0	6	28	4
230	4	9	3	4	34	8	5	24	4	6	14	0	7	3	5
240	4	16	0	5	6	6	5	33	3	6	24	0	7	14	6
250	4	22	6	5	14	4	6	6	1	6	34	0	7	25	7

A Table of Rood-Measure.

Length in Feet	Heighth or Depth in Feet. 11			12			13			14			15		
	R.	Y.	F.	R.	Y.	F.	R.	Y.	F.	R.	Y.	F.	R.	Y.	F.
1	0	1	2	0	1	3	0	1	4	0	1	5	0	1	6
2	0	2	4	0	2	6	0	2	8	0	3	1	0	3	3
3	0	3	6	0	4	0	0	4	3	0	4	6	0	5	0
4	0	4	8	0	5	3	0	5	7	0	6	2	0	6	6
5	0	6	1	0	6	6	0	7	2	0	7	7	0	8	3
6	0	7	3	0	8	0	0	8	6	0	9	3	0	10	0
7	0	8	5	0	9	3	0	10	1	0	10	8	0	11	6
8	0	9	7	0	10	6	0	11	5	0	12	4	6	13	3
9	0	11	0	0	12	0	0	13	0	0	14	0	0	15	0
10	0	12	2	0	13	3	0	14	4	0	15	5	0	16	6
20	0	24	4	0	26	6	0	28	8	0	31	1	0	33	3
30	1	0	6	1	4	0	1	7	3	1	10	6	1	14	0
40	1	12	8	1	17	3	1	21	7	1	26	2	1	30	6
50	1	25	1	1	30	6	2	2	2	2	5	7	2	11	3
60	2	1	3	2	8	0	2	16	6	2	21	3	2	28	0
70	2	13	5	2	21	3	2	32	4	3	0	8	3	8	6
80	2	25	7	2	34	6	3	7	5	3	16	4	3	25	3
90	3	2	0	3	12	0	3	22	0	3	32	0	4	6	0
100	3	14	4	3	25	3	4	0	4	4	11	5	4	26	6
110	3	26	4	4	2	6	4	14	6	4	27	1	5	3	3
120	4	2	6	4	16	0	4	29	3	5	6	6	5	20	0
130	4	14	8	4	29	3	5	7	7	5	22	2	6	0	6
140	4	27	1	5	6	6	5	22	2	6	1	7	6	17	3
150	5	3	3	5	20	0	6	0	6	6	17	3	6	34	0
160	5	15	5	5	33	3	6	15	1	6	32	8	7	14	6
170	5	27	7	6	10	6	6	29	5	7	12	4	7	31	3
180	6	4	0	6	24	0	7	8	0	7	28	0	8	12	0
190	6	16	2	7	1	3	7	22	4	8	7	5	8	28	6
200	6	28	4	7	14	6	8	0	8	8	23	2	9	9	3
210	7	4	6	7	28	0	8	15	3	9	2	6	9	26	0
220	7	16	8	8	5	3	8	27	7	9	18	2	10	6	6
230	7	29	1	8	18	6	9	8	2	9	33	7	10	23	3
240	8	5	3	8	32	0	9	22	6	10	13	3	11	4	0
250	8	19	3	9	9	3	10	1	1	10	28	8	11	28	6

A Table of Rood-Measure.

Length in Feet.	Heighth or Depth in Feet. 16			17			18			19			20		
	R.	Y.	F.	R.	Y.	F.	R.	Y.	F.	R.	Y.	F.	R.	Y.	F
1	0	1	7	0	1	8	0	2	0	0	2	1	0	2	2
2	0	3	5	0	3	7	0	4	0	0	4	2	0	4	4
3	0	5	3	0	5	6	0	6	0	0	6	3	0	6	6
4	0	7	1	0	7	5	0	8	0	0	8	4	0	8	8
5	0	8	8	0	9	4	0	10	0	0	10	5	0	11	1
6	0	10	6	0	11	3	0	12	0	0	12	6	0	13	2
7	0	12	4	0	13	2	0	14	0	0	14	7	0	15	5
8	0	14	2	0	15	1	0	16	0	0	16	8	0	17	7
9	0	16	0	0	17	0	0	18	0	0	19	0	0	20	0
10	0	17	7	0	18	8	0	30	0	0	21	1	0	22	2
20	0	35	5	1	1	7	1	4	0	1	6	2	1	8	4
30	1	17	3	1	20	6	1	24	0	1	27	3	1	30	6
40	1	35	1	2	3	5	2	8	0	2	12	4	2	16	8
50	2	16	8	2	22	4	2	28	0	2	33	5	3	3	1
60	2	34	6	3	5	3	3	12	0	3	18	6	3	25	3
70	3	16	4	3	24	2	3	32	0	4	3	7	4	12	5
80	3	34	2	4	7	1	4	16	0	4	24	8	4	32	7
90	4	16	0	4	26	0	5	0	0	5	10	0	5	20	0
100	4	33	7	5	8	8	5	20	0	5	31	1	6	6	2
110	5	15	5	5	27	7	6	4	0	6	16	2	6	28	4
120	5	33	3	6	10	6	6	24	0	7	1	3	7	14	6
130	6	15	1	6	29	5	7	8	0	7	22	4	8	0	8
140	6	32	8	7	12	4	7	28	0	8	7	5	8	23	1
150	7	14	6	7	31	3	8	12	0	8	28	6	9	9	3
160	7	32	4	8	14	2	8	32	0	9	13	7	9	31	5
170	8	14	2	8	33	1	9	16	0	9	34	8	10	17	7
180	8	32	0	9	16	0	10	0	0	10	20	0	11	4	0
190	9	13	7	9	34	8	10	20	0	11	5	1	11	26	2
200	9	31	5	10	17	7	11	4	0	11	26	2	12	12	4
210	10	13	3	11	0	6	11	24	0	12	11	3	12	34	6
220	10	31	1	11	19	5	12	8	0	12	32	4	13	20	8
230	11	12	8	12	2	4	12	28	0	13	17	5	14	7	1
240	11	30	6	12	21	3	13	12	0	14	2	6	14	29	3
250	12	12	4	13	4	2	13	32	0	14	23	7	15	15	5

A Table of Rood-Measure.

Heighth or Depth in Feet.

Length in Feet.	21			22			23			24			24		
	R.	P.	F.	R.	P.	F.	R.	P.	F.	R.	P.	F.	R.	P.	F.
1	0	2	3	0	2	4	0	2	5	0	2	6	0	2	7
2	0	4	6	0	4	8	0	5	1	0	5	3	0	5	5
3	0	7	21	0	7	3	0	7	6	0	8	5	0	8	3
4	0	9	3	0	9	7	0	10	2	0	10	6	0	11	1
5	0	11	6	0	12	2	0	12	7	0	13	3	0	13	8
6	0	14	0	0	14	6	0	15	3	0	16	0	0	16	6
7	0	16	3	0	17	1	0	17	8	0	18	6	0	19	4
8	0	18	6	0	19	4	0	20	4	0	21	3	0	22	2
9	0	21	0	0	22	0	0	23	0	0	24	0	0	25	0
10	0	23	3	0	24	4	0	25	5	0	26	6	0	27	7
20	1	10	6	1	12	8	1	15	1	1	17	3	1	19	5
30	1	34	0	2	1	3	2	4	6	2	8	0	2	11	3
40	2	21	3	2	25	7	2	30	2	2	34	6	3	3	1
50	3	8	6	3	14	2	3	19	7	3	25	3	3	30	8
60	3	31	0	4	2	6	4	9	3	4	16	0	4	22	6
70	4	19	3	4	27	1	4	34	8	5	6	6	5	14	4
80	5	6	6	5	15	5	5	24	4	5	33	3	6	6	2
90	5	30	0	6	4	0	6	14	0	6	24	0	6	34	0
100	6	17	3	6	28	4	7	3	5	7	15	6	7	25	7
110	7	4	6	7	16	8	7	29	1	8	5	3	8	17	5
120	7	28	0	8	5	3	8	18	6	8	32	0	9	9	3
130	8	15	3	8	29	7	9	8	2	9	22	6	10	1	1
140	9	2	6	9	18	2	9	33	7	10	13	3	10	28	8
150	9	26	0	10	6	6	10	23	3	11	4	0	11	20	6
160	10	13	3	10	31	1	11	12	8	11	30	6	12	12	4
170	11	0	6	11	19	5	12	2	4	12	21	3	13	4	2
180	11	24	0	12	8	0	12	28	0	13	12	0	13	32	0
190	12	11	3	12	32	4	13	19	5	14	2	6	14	23	7
200	12	34	6	13	20	8	14	7	1	14	29	3	15	15	5
210	13	22	0	14	9	3	14	32	6	15	20	0	16	7	3
220	14	9	3	14	33	7	15	22	2	16	10	6	16	35	1
230	14	32	6	15	22	0	16	11	7	17	1	3	17	26	8
240	15	20	0	16	10	6	17	1	3	17	28	0	18	18	6
250	16	7	3	16	35	1	17	26	8	18	18	6	19	10	4

A Table of Rood-Measure.

Heighth or Depth in Feet.

Length in Feet.	26			27			28			29			30		
	R.	Y.	F.	R.	Y.	F.	R.	Y.	F.	R.	Y.	F.	R.	Y.	F.
1	0	2	8	0	3	0	0	3	1	0	3	2	0	3	
2	0	5	7	0	6	0	0	6	2	0	6	4	0	6	
3	0	8	6	0	9	0	0	9	3	0	9	6	0	10	
4	0	11	5	0	12	0	0	12	4	0	12	9	0	13	
5	0	14	4	0	15	0	0	15	5	0	16	1	0	16	
6	0	17	3	0	18	0	0	18	6	0	19	3	0	20	
7	0	20	2	0	21	0	0	21	7	0	22	5	0	23	
8	0	23	1	0	24	0	0	24	8	0	25	7	0	26	
9	0	26	0	0	27	0	0	28	0	0	29	0	0	30	
10	0	28	8	0	30	0	0	31	1	0	32	2	0	33	
20	1	21	7	1	24	0	1	26	2	1	28	4	1	30	
30	2	14	6	2	18	0	2	21	3	2	24	6	2	28	
40	3	7	5	3	12	0	3	16	4	3	20	8	3	25	
50	4	0	4	4	6	0	4	11	5	4	17	1	4	27	
60	4	29	3	5	0	0	5	6	6	5	13	3	5	20	
70	5	22	2	5	30	0	6	1	7	6	29	5	6	17	
80	6	15	1	6	24	0	6	32	8	7	5	7	7	14	
90	7	8	0	7	18	0	7	28	0	8	2	0	8	12	
100	8	0	8	8	12	0	8	23	1	8	34	2	9	9	
110	8	27	7	9	6	0	9	18	2	9	30	4	10	6	
120	9	22	6	10	0	0	10	13	3	10	26	6	11	4	
130	10	15	5	10	30	0	11	8	4	11	22	8	12	1	
140	11	8	4	11	24	0	12	3	5	12	19	1	12	34	
150	12	1	4	12	18	0	12	34	9	13	15	3	13	32	
160	12	30	3	13	12	0	13	29	7	14	11	5	14	29	
170	13	23	1	14	6	0	14	24	8	15	7	1	15	26	
180	14	16	0	15	0	0	15	20	0	16	4	0	16	24	
190	15	8	8	15	30	0	15	15	1	17	0	2	17	21	
200	16	1	7	16	24	0	17	10	2	17	32	4	18	18	
210	16	30	6	17	18	0	18	5	3	18	28	6	19	16	
220	17	23	5	18	12	0	19	0	4	19	24	8	20	13	
230	18	16	4	19	6	0	19	31	5	20	21	1	21	10	
240	19	9	3	20	0	0	20	26	6	21	17	3	22	8	
250	20	2	2	20	30	0	21	21	7	22	13	5	23	5	

A Table of Yard Measure.

The Heighth or Breadth in Feet and Inches.

Length in Yards	3 Y.F.P.	2 Y.F.P.	4 Y.F.P.	6 Y.F.P.	8 Y.F.P.	10 Y.F.P.
1	0 0 25	0 0 27	0 0 28	0 0 30	0 0 61	0 0 32
2	0 0 50	0 0 54	0 0 56	0 0 59	0 0 82	0 0 64
3	0 0 75	0 0 80	0 0 84	0 0 88	0 0 23	0 0 96
4	0 1 0	0 1 0	0 1 12	0 1 17	0 1 3	0 1 28
5	0 1 25	0 1 32	0 1 40	0 1 46	0 1 53	0 1 60
6	0 1 50	0 1 59	0 1 68	0 1 75	0 1 84	0 1 92
7	0 1 75	0 1 86	0 1 96	0 2 4	0 2 14	0 2 24
8	0 2 0	0 2 12	0 2 21	0 2 34	0 2 45	0 2 56
9	0 2 25	0 2 38	0 2 51	0 2 63	0 2 76	0 2 88
10	0 2 50	0 2 65	0 2 79	0 2 93	0 3 6	0 3 20
20	0 5 0	0 5 28	0 5 56	0 5 84	0 6 12	0 6 39
30	0 7 50	0 7 93	0 8 34	0 8 76	1 0 17	1 0 57
40	1 1 0	1 1 56	1 2 11	1 2 67	1 3 23	1 3 78
50	1 1 50	1 4 20	1 4 89	1 5 58	1 6 29	1 6 98
60	1 6 0	1 6 84	1 7 67	1 8 49	2 0 35	2 1 17
70	1 8 50	2 0 48	2 1 45	2 2 41	2 4 41	2 4 37
80	2 2 0	2 3 12	2 4 23	2 5 32	2 6 42	2 7 56
90	2 4 50	2 5 76	2 7 1	2 8 24	3 0 58	3 1 76
100	2 7 0	2 8 40	3 0 77	3 2 16	3 3 52	3 4 95
110	3 0 50	3 2 4	3 3 53	3 5 8	3 6 68	3 8 14
120	3 3 0	3 4 68	3 6 33	3 8 0	4 0 67	4 2 34
130	3 5 50	3 7 32	4 0 11	4 1 92	4 3 71	4 5 53
140	3 8 0	4 0 96	4 2 89	4 4 84	4 6 79	4 8 72
150	4 1 50	4 3 60	4 5 67	4 7 75	5 0 86	5 2 90
160	4 4 0	4 6 24	4 8 45	5 1 66	5 4 90	5 6 11
170	4 6 50	4 8 88	5 2 23	5 4 58	5 6 93	6 0 31
180	5 0 0	5 2 52	5 5 1	5 7 50	6 1 1	6 3 50
190	5 2 50	5 5 16	5 7 79	6 1 42	6 4 8	6 6 70
200	5 5 0	5 7 80	6 1 57	6 4 34	6 7 11	7 0 90
210	5 7 50	6 1 44	6 4 35	6 7 26	7 1 15	7 4 9
220	6 1 0	6 4 8	6 7 12	7 1 18	7 4 22	7 7 28
230	6 3 50	6 6 72	7 0 90	7 4 10	7 7 27	8 1 47
240	6 6 0	7 0 36	7 3 68	7 7 1	8 1 33	8 4 67
250	6 8 30	7 3 0	7 6 45	8 0 93	8 4 39	8 7 87

A Table of Yard Measure.

The Heighth or Breadth in Feet and Inches.

Length in Inc.	4			2			4			6			8			10		
	Y.	F.	P.	Y.	F.	P.	Y.	F.	P.	Y.	F.	P.	Y.	F.	P.	Y.	F.	P.
1	0	0	34	0	0	35	0	0	37	0	0	38	0	0	39	0	0	41
2	0	0	67	0	0	70	0	0	73	0	0	76	0	0	78	0	0	81
3	0	1	0	0	1	4	0	1	9	0	1	13	0	1	17	0	1	21
4	0	1	34	0	1	39	0	1	45	0	1	50	0	1	59	0	1	61
5	0	1	67	0	1	74	0	1	81	0	1	88	0	1	95	0	2	2
6	0	2	0	0	2	9	0	2	17	0	2	25	0	2	34	0	2	92
7	0	2	34	0	2	44	0	2	53	0	2	63	0	2	73	0	2	82
8	0	2	67	0	2	74	0	2	87	0	3	0	0	3	12	0	3	82
9	0	3	0	0	3	13	0	3	26	0	3	38	0	3	51	0	3	62
10	0	3	34	0	3	48	0	3	62	0	3	75	0	3	90	0	4	3
20	0	6	67	0	6	95	0	7	23	0	7	50	0	7	79	0	8	6
30	1	1	0	1	1	42	1	1	84	1	2	25	1	2	67	1	3	9
40	1	4	34	1	4	90	1	5	45	1	6	0	1	6	56	1	7	12
50	1	7	67	1	8	37	2	0	6	2	0	75	2	1	45	2	2	14
60	2	2	0	2	2	84	2	3	67	2	4	50	2	5	34	2	6	17
70	2	5	34	2	6	31	2	7	28	2	8	25	3	0	23	3	1	20
80	2	8	67	3	0	78	3	1	89	3	3	0	3	4	12	3	5	23
90	3	3	0	3	4	25	3	5	50	3	6	75	3	8	1	4	0	26
100	3	6	34	3	7	73	4	0	11	4	1	50	4	2	90	4	4	28
110	4	0	67	4	0	21	4	3	72	4	5	25	4	6	79	4	8	31
120	4	4	0	4	5	68	4	7	33	5	0	0	5	1	68	5	3	34
130	4	7	34	5	0	15	5	1	94	5	3	75	5	5	57	5	7	37
140	5	1	67	5	3	62	5	5	65	5	7	50	6	0	45	6	2	40
150	5	5	0	5	7	9	6	0	16	6	2	25	6	4	34	6	6	42
160	5	8	34	6	1	56	6	3	77	6	6	0	6	8	23	7	1	45
170	6	2	67	6	5	3	6	7	39	7	0	75	7	3	12	7	5	48
180	6	6	0	6	8	50	7	2	0	7	4	50	7	7	0	8	0	50
190	7	0	34	7	2	98	7	5	61	7	8	25	8	1	89	8	4	53
200	7	3	67	7	6	45	8	0	22	8	3	0	8	5	78	8	8	56
210	7	7	0	8	0	92	8	3	83	8	6	75	9	0	67	9	3	59
220	8	1	34	8	4	40	8	7	44	8	1	50	9	4	56	9	7	62
230	8	4	67	8	7	87	9	2	5	9	5	25	9	8	45	10	2	65
240	8	8	0	9	2	35	9	5	67	10	0	0	10	3	34	10	6	68
250	9	2	34	9	5	81	10	0	28	10	3	75	10	7	28	11	1	70

A Table of Yard Measure.

Length in Inc.	The Heighth or Breadth in Feet and Inches.																	
	5			2			4			6			8			10		
	Y.	F.	P.	Y.	F.	P.	Y.	F.	P.	Y.	F.	P.	Y.	F.	P.	Y.	F.	P.
1	0	0	42	0	0	44	0	0	45	0	0	46	0	0	48	0	0	49
2	0	0	84	0	0	87	0	0	90	0	0	92	0	0	95	0	0	98
3	0	1	25	0	1	30	0	1	34	0	1	39	0	1	42	0	1	46
4	0	1	67	0	1	73	0	1	79	0	1	84	0	1	90	0	1	95
5	0	2	9	0	2	16	0	2	23	0	2	30	0	2	38	0	2	44
6	0	2	50	0	2	59	0	2	68	0	2	76	0	2	85	0	2	93
7	0	2	92	0	3	2	0	3	12	0	3	22	0	3	32	0	3	41
8	0	3	34	0	3	45	0	3	57	0	3	68	6	3	79	0	3	90
9	0	3	75	0	3	88	0	4	1	0	4	14	0	4	26	0	3	39
10	0	4	17	0	4	31	0	4	45	0	4	59	0	4	73	0	4	87
20	0	8	34	0	8	62	0	8	90	1	0	17	1	0	46	1	0	74
30	1	3	50	1	3	93	1	4	34	1	4	76	1	5	19	1	5	60
40	1	7	67	1	8	23	1	8	79	2	0	34	2	0	91	2	1	46
50	2	2	84	2	3	54	2	4	23	2	4	92	2	5	63	2	6	32
60	2	7	0	2	7	84	2	8	68	3	0	50	3	1	35	3	2	18
70	3	2	17	3	3	14	3	4	12	3	5	8	3	6	7	3	7	4
80	3	6	34	3	7	45	3	8	77	4	0	67	4	1	79	4	2	90
90	4	1	51	4	2	75	4	4	1	4	5	25	4	6	51	4	7	76
100	4	5	67	4	7	6	4	8	45	5	0	84	5	2	23	5	3	62
110	5	0	84	5	2	36	5	3	89	5	5	42	5	6	15	5	8	48
120	5	5	0	5	6	67	5	8	34	6	1	0	6	2	67	6	4	34
130	6	0	17	6	1	97	6	3	78	6	5	58	6	7	39	7	0	20
140	6	4	33	6	6	28	6	8	23	7	1	17	7	3	11	7	5	6
150	6	8	50	7	1	58	7	3	66	7	5	75	7	7	83	8	0	92
160	7	3	68	7	5	9	7	8	11	8	1	33	8	3	55	8	5	78
170	7	7	84	8	1	19	8	3	55	8	5	91	8	8	27	9	1	64
180	8	3	0	8	5	50	8	8	0	9	1	50	9	4	0	9	6	50
190	8	7	17	9	0	80	9	3	44	9	6	8	9	8	73	10	2	36
200	9	2	34	9	5	11	9	7	89	10	1	66	10	4	45	10	7	22
210	9	6	50	10	0	42	10	3	33	10	6	25	11	0	18	11	3	8
220	10	1	67	10	4	73	10	7	77	11	1	83	11	4	90	11	7	94
230	10	5	84	11	0	3	11	3	22	11	6	42	12	0	62	12	3	80
240	11	1	0	11	4	34	11	7	66	12	2	0	12	5	94	12	8	86
250	11	5	17	11	8	65	12	3	11	12	6	39	13	1	6	13	4	53

A Table of Yard Measure.

Length in Inc.	The Heighth or Breadth in Feet and Inches.																	
	6			7			8			9			10			11		
	Y.	F.	P.	Y.	F.	P.	Y.	F.	P.	Y.	F.	P.	Y.	F.	P.	Y.	F.	P.
1	0	0	50	0	0	52	0	0	53	0	0	55	0	0	56	0	0	58
2	0	1	0	0	1	3	0	1	6	0	1	9	0	1	11	0	1	14
3	0	1	50	0	1	55	0	1	57	0	1	63	0	1	66	0	1	71
4	0	2	0	0	2	6	0	2	11	0	2	17	0	2	20	0	2	28
5	0	2	50	0	2	58	0	2	65	0	2	71	0	2	74	0	2	85
6	0	3	0	0	3	9	0	3	17	0	3	25	0	3	28	0	3	42
7	0	3	50	0	3	60	0	3	70	0	3	79	0	3	82	0	3	99
8	0	4	0	0	4	11	0	4	23	0	4	33	0	4	37	0	4	56
9	0	4	50	0	4	72	0	4	76	0	4	87	0	5	91	0	5	13
10	0	5	0	0	5	14	0	5	28	0	5	42	0	5	56	0	5	70
20	1	1	0	1	1	28	1	1	56	1	1	83	1	2	12	1	2	41
30	1	6	0	1	6	42	1	6	84	1	7	25	1	7	67	1	8	10
40	2	2	0	2	2	56	2	3	11	2	3	67	2	4	23	2	4	79
50	2	7	0	2	7	70	2	8	39	3	0	8	3	0	78	3	1	49
60	3	3	0	3	3	84	3	4	67	3	5	50	3	6	33	3	7	18
70	3	8	0	3	8	98	4	0	94	4	1	92	4	2	89	4	3	87
80	4	4	0	4	5	12	4	6	22	4	7	34	4	8	45	5	0	56
90	5	0	0	5	1	26	5	2	50	5	3	76	5	5	1	5	6	24
100	5	5	0	5	6	39	5	7	78	6	0	17	6	1	56	6	2	95
110	6	1	0	6	2	51	6	4	6	6	5	59	6	7	11	6	8	64
120	6	6	0	6	7	84	7	0	33	7	2	0	7	3	67	7	5	54
130	7	2	0	7	3	92	7	5	61	7	7	42	8	0	22	8	2	3
140	7	7	0	8	0	5	8	1	89	8	3	83	8	5	78	8	7	93
150	8	3	0	8	5	13	8	7	17	9	0	25	9	2	33	9	4	42
160	8	8	0	9	1	25	9	3	44	9	5	67	9	7	89	10	0	11
170	9	4	0	9	6	37	9	8	72	10	2	8	10	4	45	10	6	80
180	10	0	0	10	2	50	10	5	0	10	7	50	11	1	0	11	3	50
190	10	5	0	10	7	64	11	1	30	11	3	92	11	6	56	12	0	19
200	11	1	0	11	3	78	11	6	57	12	0	34	12	3	12	12	5	89
210	11	6	0	11	8	92	12	2	85	12	5	75	12	8	67	13	2	58
220	12	2	0	12	5	6	12	8	12	13	2	17	13	5	23	13	8	28
230	12	7	0	13	1	20	13	4	40	13	7	59	14	1	79	14	4	97
240	13	3	0	13	6	34	14	0	67	14	4	0	14	7	35	15	1	67
250	13	8	0	14	2	48	14	5	95	15	0	42	15	3	90	15	7	37

A Table of Yard Measure.

Length in Inc.	The Heighth or Breadth in Feet and Inches.																	
	7			2			4			6			8			10		
	Y.	F.	P.	Y.	F.	P.	Y.	F.	P.	Y.	F.	P.	Y.	F.	P.	Y.	F.	P.
1	0	0	54	0	0	60	0	0	62	0	0	63	0	0	64	0	0	66
2	0	1	17	0	1	20	0	1	23	0	1	26	0	1	28	0	1	31
3	0	1	75	0	1	80	0	1	84	0	1	88	0	1	92	0	1	96
4	0	2	32	0	2	39	0	2	45	0	2	51	0	2	56	0	2	62
5	0	2	90	0	2	99	0	3	6	0	3	13	0	3	20	0	3	27
6	0	3	48	0	3	59	0	3	67	0	3	75	0	3	84	0	3	92
7	0	4	5	0	4	18	0	4	28	0	4	38	0	4	48	0	4	57
8	0	4	63	0	4	78	0	4	89	0	5	0	0	5	12	0	5	23
9	0	5	21	0	5	38	0	5	50	0	5	62	0	5	76	0	5	88
10	0	5	81	0	5	98	0	6	11	0	6	25	0	6	39	0	6	53
20	1	2	67	1	2	95	1	3	22	1	3	50	1	3	78	1	4	20
30	1	8	51	1	8	91	2	0	33	2	0	75	2	1	17	2	1	89
40	2	4	34	2	5	87	2	6	44	2	7	0	2	7	56	2	8	52
50	3	0	18	3	2	83	3	3	55	3	4	25	3	4	95	3	5	14
60	3	9	2	3	8	79	4	0	66	4	1	50	4	2	34	4	2	77
70	4	4	84	4	5	75	4	6	77	4	7	75	4	8	73	4	9	40
80	5	1	69	5	2	71	5	3	88	5	5	0	5	6	12	5	7	3
90	5	7	40	5	8	77	6	1	0	6	2	25	6	3	51	6	4	65
100	6	4	34	6	5	73	6	7	11	6	8	50	7	0	90	7	2	28
110	7	1	17	7	2	70	7	4	22	7	5	75	7	7	29	7	8	81
120	7	8	0	7	8	67	8	1	33	8	3	0	8	4	68	8	0	34
130	8	3	84	8	5	64	8	7	44	9	0	25	9	2	6	9	5	86
140	9	0	67	9	2	61	9	4	55	9	6	50	9	8	45	10	1	39
150	9	6	50	9	8	58	10	1	66	10	3	75	10	5	84	10	7	93
160	10	3	33	10	5	55	10	7	77	11	1	0	11	3	23	11	5	45
170	11	0	16	11	2	53	11	4	88	11	7	25	12	0	61	12	2	97
180	11	6	0	11	8	50	12	2	0	12	4	50	12	7	0	13	0	50
190	12	2	83	12	5	46	12	8	11	13	1	75	13	4	39	13	7	3
200	12	8	68	13	2	51	13	5	23	13	8	0	14	1	78	14	4	56
210	13	5	51	13	8	47	14	2	34	14	5	25	14	8	17	15	2	9
220	14	2	34	14	5	43	14	8	45	15	2	50	15	5	56	15	8	62
230	14	8	18	15	2	40	15	5	56	15	8	75	16	2	95	16	6	14
240	15	5	1	15	8	35	16	2	67	16	6	6	17	0	34	17	3	67
250	16	1	84	16	5	31	16	8	79	17	3	25	17	6	73	18	1	20

A Table of Yard Measure.

Length in Inc.	The Heighth or Breadth in Feet and Inches.											
	8		2		4		6		8		10	
	Y.	F. P.	Y.	F. P.	Y.	F. P.	Y.	F. P.	Y.	F. P.	Y.	F. P.
1	0	0 67	0	0 69	0	0 70	0	0 72	0	0 73	0	0 74
12	0	1 34	0	1 37	0	1 39	0	1 43	0	1 46	0	1 48
3	0	2 0	0	2 5	0	2 9	0	2 14	0	2 18	0	2 21
4	0	2 67	0	2 73	0	2 78	0	2 85	0	2 90	0	2 95
5	0	3 34	0	3 41	0	3 48	0	3 55	0	3 63	0	3 69
6	0	4 0	0	4 9	0	4 17	0	4 26	0	4 34	0	4 43
7	0	4 67	0	4 77	0	4 87	0	4 97	0	5 6	0	5 17
8	0	5 34	0	5 45	0	5 56	0	5 68	0	5 78	0	5 91
9	0	6 0	0	6 13	0	6 26	0	6 39	0	6 50	0	6 65
10	0	0 67	0	6 81	0	6 95	0	7 9	0	7 23	0	7 37
20	1	4 34	1	4 62	1	4 89	1	5 18	1	5 46	1	5 73
30	2	2 0	2	2 42	2	2 84	2	3 26	2	3 68	2	4 9
40	2	8 67	3	0 23	3	0 78	3	1 34	3	1 90	3	2 45
50	3	6 34	3	7 3	3	7 73	3	8 43	4	0 12	4	0 81
60	4	4 0	4	4 84	4	5 67	4	6 51	4	7 34	4	8 17
70	5	1 67	5	2 64	5	3 62	5	4 55	5	5 56	5	6 53
80	5	8 34	6	0 45	6	1 56	6	2 63	6	3 78	6	4 89
90	6	6 0	6	7 25	6	8 51	7	0 70	7	2 1	7	3 26
100	7	3 67	7	5 6	7	6 45	7	7 84	8	0 23	8	1 62
110	8	1 34	8	2 86	8	4 40	8	5 92	8	7 45	8	8 98
120	8	8 0	9	0 67	9	2 33	9	4 0	9	5 67	9	7 34
130	9	5 67	9	7 48	10	0 28	10	2 9	10	3 89	10	5 70
140	10	3 34	10	5 28	10	7 21	11	0 17	11	2 11	11	4 6
150	11	1 0	11	3 9	11	5 16	11	7 25	12	0 33	12	2 42
160	11	7 67	12	0 89	12	3 10	12	5 34	12	7 55	13	0 78
170	12	5 34	12	7 70	13	1 5	13	3 38	13	5 77	13	8 14
180	13	3 0	13	5 50	13	8 0	14	1 50	14	4 0	14	6 50
190	14	0 67	14	3 31	14	5 94	14	8 59	11	2 22	15	4 86
200	14	7 34	15	1 11	15	3 89	15	6 67	16	0 45	16	3 22
210	15	5 0	15	7 92	16	1 83	16	4 76	16	7 67	17	1 58
220	16	2 67	16	5 72	16	8 78	17	2 84	17	5 89	17	8 94
230	17	0 34	17	3 53	17	6 72	18	0 92	18	4 12	18	7 30
240	17	7 0	18	1 33	18	5 67	18	8 0	19	2 34	19	5 66
250	18	4 67	18	8 14	19	2 62	19	6 9	20	0 56	20	4 3

A Table of Yard Measure.

The Heighth or Breath in Feet and Inches.

Length in Inches.	9			2			4			6			8			10		
	Y.	F.	P.	Y.	F.	P.	Y.	F.	P.	Y.	F.	P.	Y.	F.	P.	Y.	F.	P.
1	0	0	76	0	0	77	0	0	79	0	0	80	0	0	81	0	0	83
2	0	1	51	0	1	53	0	1	58	0	1	60	0	1	62	0	1	65
3	0	2	26	0	2	30	0	2	37	0	2	39	0	2	42	0	2	47
4	0	3	1	0	3	6	0	3	36	0	3	19	0	3	23	0	3	29
5	0	3	76	0	3	83	0	3	95	0	3	98	0	4	3	0	4	11
6	0	4	51	0	4	59	0	4	72	0	4	77	0	4	84	0	4	93
7	0	5	26	0	5	35	0	5	53	0	5	56	0	5	64	0	5	75
8	0	6	1	0	6	12	0	6	22	0	6	35	0	6	45	0	6	57
9	0	6	75	0	6	89	0	7	1	0	7	14	0	7	25	0	7	39
10	0	7	50	0	7	65	0	7	79	0	7	93	0	8	7	0	8	20
20	1	9	0	1	6	29	1	6	57	1	6	85	1	7	11	1	7	40
30	2	4	50	2	4	93	2	5	35	2	5	76	2	0	15	2	6	59
40	3	3	0	3	3	56	3	4	12	3	4	68	3	5	20	3	5	78
50	4	1	50	4	2	20	4	2	90	4	3	59	4	4	24	4	4	98
60	5	0	0	5	0	84	5	1	68	5	2	51	5	3	28	5	4	17
70	5	7	50	5	8	48	6	0	45	6	1	42	6	2	33	6	3	37
80	6	6	0	6	7	12	6	8	23	7	0	34	7	1	37	7	2	56
90	7	4	50	7	5	75	7	7	1	7	8	25	8	0	41	8	1	75
100	8	3	0	8	4	39	8	5	79	8	7	17	8	8	56	9	0	95
110	9	1	50	9	3	3	9	4	57	9	6	9	9	7	2	10	0	14
120	10	0	0	10	1	67	10	3	34	10	5	0	10	6	68	10	8	34
130	10	7	50	11	0	31	11	2	12	11	3	92	11	5	30	11	7	53
140	11	6	0	11	7	95	12	0	89	12	2	83	12	4	36	12	6	73
150	12	4	50	12	6	59	12	8	67	13	1	75	13	3	42	13	5	92
160	13	3	0	13	5	23	13	7	45	14	0	66	14	2	48	14	5	12
170	14	1	50	14	3	87	14	6	22	14	8	58	15	1	54	15	4	31
180	15	0	0	15	2	50	15	5	0	15	7	50	16	1	0	16	3	50
190	15	7	50	16	1	14	16	3	78	16	6	42	17	0	6	17	2	70
200	16	6	0	16	8	78	17	2	56	17	5	34	17	8	11	18	1	89
210	17	4	50	17	7	42	18	1	34	18	4	26	18	7	17	19	1	9
220	18	3	0	18	6	6	19	0	12	19	3	18	19	6	22	20	0	28
230	19	1	50	19	4	70	19	7	90	20	2	10	20	3	28	20	8	48
240	20	0	0	20	3	34	20	6	68	21	1	1	21	4	33	21	7	67
250	20	7	50	21	1	98	21	5	45	21	8	93	22	3	39	22	6	85

A Table of Yard Measure.

The Heighth or Breadth in *Feet* and Inches.

Length in Inches	10			2			4			6			8			10		
	Y.	F.	P.	Y.	F.	P.	Y.	F.	P.	Y.	F.	P.	Y.	F.	P.	Y.	F.	P.
1	0	1	84	0	0	85	0	0	87	0	0	88	0	0	89	0	0	91
2	0	1	67	0	1	69	0	1	73	0	1	76	0	1	78	0	1	81
3	0	2	50	0	2	54	0	2	59	0	2	63	0	2	67	0	2	71
4	0	3	34	0	3	39	0	3	45	0	3	51	0	3	56	0	3	62
5	0	4	17	0	4	4	0	4	31	0	4	39	0	4	45	0	4	52
6	0	5	0	0	4	89	0	5	17	0	5	26	0	5	34	0	5	42
7	0	5	84	0	5	74	0	6	3	0	6	14	0	6	23	0	6	32
8	0	6	67	0	6	59	0	6	89	0	7	1	0	7	12	0	7	23
9	0	7	50	0	7	44	0	7	75	0	7	89	0	8	1	0	8	13
10	0	8	34	0	8	48	0	8	62	0	8	76	0	8	90	1	0	3
20	1	7	67	1	7	95	1	8	23	1	8	51	1	8	79	2	0	6
30	2	7	0	2	7	42	2	7	84	2	8	26	2	8	68	3	0	8
40	3	6	34	3	6	92	3	7	45	3	8	0	3	8	57	4	0	1
50	4	5	67	4	6	37	4	7	6	4	7	75	4	8	46	5	0	1
60	5	5	0	5	5	84	5	6	67	5	7	50	5	8	35	6	0	1
70	6	4	34	6	5	32	6	6	28	6	7	25	6	8	24	7	0	2
80	7	3	67	7	4	79	7	5	89	7	7	0	7	8	13	8	0	2
90	8	3	0	8	4	26	8	5	50	8	6	76	8	8	1	9	0	2
100	9	2	34	9	3	73	9	5	11	9	6	50	9	7	90	10	0	2
110	10	1	67	10	3	20	10	4	72	10	6	25	10	7	79	11	0	3
120	11	1	0	11	2	67	11	4	33	11	6	0	11	7	68	12	0	3
130	12	0	34	12	2	14	12	3	94	12	5	75	12	7	57	13	0	3
140	12	8	67	13	1	61	13	3	55	13	5	50	13	7	45	14	0	3
150	13	8	0	14	1	8	14	3	16	14	5	25	14	7	34	15	0	4
160	14	7	34	15	0	55	15	2	77	15	5	0	15	7	23	16	0	4
170	15	6	67	16	0	33	16	2	38	16	4	75	16	7	12	17	0	4
180	16	6	0	16	8	50	17	2	0	17	4	50	17	7	0	18	0	5
190	17	5	34	17	7	97	18	1	61	18	4	25	18	6	91	19	0	5
200	18	4	67	18	7	44	19	1	22	19	4	0	19	6	80	20	0	5
210	19	4	0	19	6	92	20	0	83	20	3	75	20	6	68	21	0	5
220	20	3	34	20	6	39	21	0	44	21	3	50	21	6	57	22	0	6
230	21	2	67	21	5	87	22	0	5	22	3	25	22	6	46	23	0	6
240	22	2	0	22	5	34	22	8	66	23	3	1	23	6	35	24	0	6
250	23	1	4	23	4	81	23	8	48	24	2	76	24	6	23	25	0	7

A Table of *Foot* Measure for Glass, &c.

The breadth to every Inch, and two tenths of an Inch.

Length in In.	12		2		4		6		8		15		2		4		6		8	
	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.
1	0	9	0	90	90		4 0	9			0	9 0		90	90		1 0	0	10	
2	0	17	0	170	180		8 0	18			0	1 8 0		180	190		1 9 0		19	
3	0	25	0	260	260		27 0	27			0	2 8 0		280	280		290		29	
4	0	34	0	350	35		36 0	36			0	37 0		37 0	37 0		38		39	
5	0	42	0	430	44 0		75 0	45			0	47 0		470	47 0		480		48	
6	0	50	0	520	530		5 0	55			0	5 6 0		560	56		57 0		57	
7	0	59	0	610	61 0		62 0	63			0	6 5 0		650	650		670		68	
8	0	67	0	690	7 0		70 0	72			0	7 5 0		740	740		760		76	
9	0	75	0	770	780		79 0	81			0	8 4 0		850	850		860		88	
10	0	84	0	860	870		890	90			0	9 4 0		93	940		95 0		97	
20	1	67	1	701	731		761	79			1	8 1 1		841	861		901		93	
30	2	50	2	542	592		632	67			2	7 2 2		762	792		842		88	
40	3	34	3	393	453		503	56			3	6 2 3		683	733		793		84	
50	4	17	4	234	314		384	44			4	534		594	664		724		80	
60	5	0	5	95	175		255	34			5	425		505	57		65		76	
70	5	84	5	946	36		136	23			6	326		426	514		626		72	
80	6	67	6	796	907		07	11			7	237		347	438		567		67	
90	7	50	7	637	767		898	0			8	138		258	3	8	5	8	63	
100	8	34	8	488	628		768	90			9	39		179	311		459		59	

	14		2		4		6		8		15		2		4		6		8	
	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.
1	0	10	0	10	0	10	0	11	0	11	0	11 0		11	0	11	0	110		11
2	0	20	0	20	0	21	0	21	0	21	0	21 0		21	0	220		220		23
3	0	30	0	21	0	30	0	31	0	31	0	32 0		33	0	35 0		340		34
4	0	39	0	40	0	41	0	41	0	41	0	42 0		42	0	430		440		45
5	0	49	0	50	0	50	0	51	0	51	0	53 0		53	0	540		550		56
6	0	59	0	60	0	60	0	62	0	63	0	63 0		64	0	940		660		67
7	0	69	0	70	0	71	0	72	0	73	0	74 0		75	0	760		770		78
8	0	79	0	80	0	81	0	82	0	82	0	84 0		85	0	870		870		88
9	0	88	0	90	0	91	0	9	0	93	0	95 0		96	0	98	0	990		99
10	0	98	0	99	1	01	1	1	2		1	1 1		51		61		91		10
20	1	95	1	98	2	02	3	2	6		2	92		122		142		172		20
30	2	92	2	97	3	03	4	3	8		3	133		173		213		253		29
40	3	90	3	95	4	04	6	4	12		4	174		234		284		344		40
50	4	87	4	94	5	05	7	5	14		5	215		285		345		425		49
60	5	84	5	93	6	06	9	6	18		6	256		346		436		505		59
70	6	81	6	91	7	07	10	7	20		7	307		407		517		597		69
80	7	79	7	90	8	08	11	8	22		8	348		458		568		678		78
90	8	76	8	89	9	09	13	9	26		9	389		519		649		769		89
100	9	72	9	87	10	0	10	14	10	28	10	42	10	56	10	70	10	84	10	98

A Table of Foot Measure for Glass, &c.

The breadth to every Inch, and two tenths of an Inch.

Length in Inc.	16		2		4		6		8		17		2		4		6		8	
	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.
1	0	11	0	11	0	11	0	12	0	12	0	12	0	12	0	12	0	13	0	13
2	0	23	0	23	0	24	0	24	0	24	0	24	0	24	0	24	0	24	0	25
3	0	34	0	34	0	35	0	35	0	35	0	36	0	37	0	37	0	37	0	37
4	0	45	0	46	0	46	0	46	0	47	0	48	0	42	0	50	0	50	0	50
5	0	56	0	57	0	58	0	58	0	59	0	60	0	60	0	61	0	62	0	63
6	0	67	0	68	0	69	0	70	0	71	0	72	0	72	0	73	0	74	0	75
7	0	79	0	80	0	81	0	82	0	83	0	84	0	85	0	85	0	86	0	87
8	0	90	0	91	0	92	0	93	0	94	0	95	0	96	0	97	0	99	1	0
9	1	01	1	1	1	3	1	4	1	5	1	7	1	8	1	9	1	11	1	13
10	1	11	1	12	1	14	1	15	1	17	1	18	1	19	1	20	1	22	1	23
20	2	23	2	26	2	28	2	31	2	34	2	37	2	40	2	43	2	45	2	48
30	3	34	3	38	3	42	3	46	3	50	3	55	3	59	3	63	3	69	3	73
40	4	45	4	51	4	56	4	62	4	67	4	73	4	79	4	83	4	90	4	96
50	5	56	5	63	5	70	5	77	5	84	5	91	5	98	5	106	5	112	5	120
60	6	67	6	76	6	85	6	94	7	0	7	9	7	18	7	27	7	34	7	43
70	7	79	7	89	7	99	8	8	8	17	8	27	8	37	8	47	8	56	8	66
80	8	90	9	1	9	12	9	23	9	34	9	45	9	56	9	67	9	79	9	90
90	10	1	10	13	10	26	10	39	10	51	10	63	10	76	10	89	11	1	11	13
100	11	11	11	25	11	39	11	53	11	6	11	81	11	95	12	9	12	23	12	37

	16		2		4		6		8		19		2		4		6		8	
	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.
1	0	14	0	14	0	14	0	14	0	14	0	14	0	14	0	14	0	14	0	14
2	0	25	0	25	0	25	0	26	0	26	0	27	0	28	0	28	0	28	0	29
3	0	38	0	39	0	39	0	39	0	40	0	40	0	41	0	41	0	42	0	42
4	0	50	0	50	0	51	0	52	0	53	0	53	0	54	0	55	0	55	0	55
5	0	63	0	64	0	65	0	65	0	66	0	66	0	67	0	68	0	69	0	70
6	0	75	0	77	0	78	0	79	0	79	0	79	0	80	0	81	0	82	0	83
7	0	88	0	89	0	90	0	91	0	92	0	93	0	94	0	95	0	96	0	98
8	1	0	1	1	1	2	1	3	1	4	1	5	1	6	1	7	1	9	1	11
9	1	13	1	14	1	15	1	16	1	17	1	18	1	19	1	20	1	22	1	24
10	1	25	1	26	1	27	1	29	1	30	1	31	1	34	1	35	1	37	1	38
20	2	50	2	53	2	54	2	57	2	60	2	63	2	68	2	71	2	73	2	76
30	3	75	3	79	3	84	3	88	3	92	3	95	4	0	4	4	4	8	4	12
40	5	0	5	6	5	11	5	17	5	23	5	26	5	34	5	39	5	45	5	51
50	6	25	6	32	6	39	6	46	6	53	6	60	6	67	6	74	6	81	6	88
60	7	50	7	59	7	66	7	75	7	84	7	92	7	101	7	109	7	95	7	58
70	8	75	8	85	8	94	9	4	9	14	9	24	9	34	9	44	9	54	9	64
80	10	0	10	11	10	23	10	34	10	45	10	56	10	68	10	79	10	67	10	78
90	11	25	11	38	11	50	11	63	11	76	11	88	12	1	12	13	12	26	12	39
100	12	50	12	64	12	78	12	92	13	6	13	20	13	34	13	48	13	62	13	75

A Table of Foot Measure for Glass, &c.

The breadth to every Inch and two tenths of an Inch.

Length in Inc.	20		2		4		6		8		21		2		4		6		8	
	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.
1	0	14	0	14	0	14	0	15	0	15	0	15	0	15	0	15	0	16	0	16
2	0	28	0	28	0	29	0	29	0	29	0	30	0	30	0	30	0	31	0	31
3	0	42	0	43	0	43	0	43	0	43	0	44	0	44	0	44	0	45	0	45
4	0	56	0	57	0	58	0	58	0	58	0	59	0	59	0	59	0	60	0	60
5	0	70	0	70	0	71	0	72	0	73	0	74	0	74	0	75	0	76	0	77
6	0	84	0	85	0	86	0	87	0	87	0	88	0	89	0	90	0	91	0	92
7	0	98	0	98	1	0	1	1	1	2	1	3	1	4	1	5	1	6	1	7
8	1	11	1	12	1	14	1	15	1	16	1	17	1	18	1	19	1	21	1	22
9	1	25	1	26	1	28	1	29	1	30	1	31	1	32	1	33	1	35	1	36
10	1	39	1	41	1	42	1	43	1	45	1	46	1	48	1	49	1	50	1	52
20	2	78	2	81	2	84	2	87	2	90	2	92	2	95	2	98	3	0	3	3
30	4	17	4	22	4	25	4	29	4	34	4	38	4	42	4	46	4	50	4	55
40	5	56	5	62	5	67	5	73	5	79	5	84	5	90	5	95	6	0	6	6
50	6	95	7	3	7	9	7	15	7	22	7	29	7	36	7	43	7	50	7	57
60	8	34	8	43	8	50	8	59	8	68	8	77	8	84	8	93	9	0	9	9
70	9	73	9	84	9	92	10	1	10	11	10	21	10	31	10	41	10	50	10	60
80	11	11	11	23	11	34	11	45	11	56	11	67	11	78	11	89	12	0	12	11
90	12	50	12	65	12	76	12	88	13	1	13	14	13	27	13	40	13	50	13	63
100	13	90	14	4	14	17	14	31	14	45	14	59	14	73	14	87	15	0	15	14

	22		2		4		6		8		23		2		4		6		8	
	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.
1	0	16	0	16	0	16	0	16	0	16	0	10	0	16	0	17	0	17	0	17
2	0	31	0	32	0	32	0	33	0	33	0	33	0	33	0	34	0	34	0	34
3	0	45	0	45	0	46	0	47	0	47	0	48	0	48	0	49	0	49	0	50
4	0	60	0	61	0	62	0	63	0	63	0	64	0	65	0	66	0	66	0	66
5	0	77	0	77	0	78	0	80	0	80	0	81	0	81	0	82	0	82	0	82
6	0	93	0	94	0	95	0	96	0	97	0	98	0	98	0	99	1	0	1	0
7	1	8	1	8	1	9	1	11	1	11	1	12	1	12	1	13	1	14	1	14
8	1	23	1	24	1	25	1	27	1	27	1	28	1	29	1	29	1	30	1	31
9	1	37	1	39	1	41	1	43	1	43	1	44	1	44	1	46	1	48	1	49
10	1	53	1	54	1	56	1	58	1	59	1	60	1	62	1	63	1	65	1	66
20	3	6	3	9	3	13	3	16	3	19	3	22	3	23	3	26	3	28	3	31
30	4	59	4	63	4	67	4	72	4	76	4	80	4	83	4	87	4	93	4	97
40	6	11	6	17	6	23	6	29	6	35	6	41	6	45	6	51	6	56	6	62
50	7	65	7	72	7	79	7	86	7	93	7	99	8	6	8	13	8	20	8	27
60	9	17	9	26	9	34	9	43	9	52	9	61	9	67	9	76	9	84	9	93
70	10	70	10	80	10	90	10	99	11	9	11	19	11	28	11	38	11	48	11	58
80	12	23	12	34	12	45	12	56	12	67	12	78	12	90	13	1	13	12	13	23
90	13	76	13	89	14	2	14	15	14	28	14	41	14	50	14	63	14	76	14	89
100	15	28	15	42	15	55	15	70	15	84	15	48	15	11	16	25	16	39	16	53

A Table for finding the Content in Squares.

Length in Feet | Breadth in Feet

Length in Feet	1		2		3		4		5		6		7		8		9		10	
	S.	F.	S.	F.	S.	F.	S.	F.	S.	F.	S.	F.	S.	F.	S.	F.	S.	F.	S.	F.
1	0	1	0	2	0	3	0	4	0	5	0	6	0	7	0	8	0	9	0	10
2	0	2	0	4	0	6	0	8	0	10	0	12	0	14	0	16	0	18	0	20
3	0	3	0	6	0	9	0	12	0	15	0	18	0	21	0	24	0	27	0	30
4	0	4	0	8	0	12	0	16	0	20	0	24	0	28	0	32	0	36	0	40
5	0	5	0	10	0	15	0	20	0	25	0	30	0	35	0	40	0	45	0	50
6	0	6	0	12	0	18	0	24	0	30	0	36	0	42	0	48	0	54	0	60
7	0	7	0	14	0	21	0	28	0	35	0	42	0	49	0	56	0	63	0	70
8	0	8	0	16	0	24	0	32	0	40	0	48	0	56	0	64	0	72	0	80
9	0	9	0	18	0	27	0	36	0	45	0	54	0	63	0	72	0	81	0	90
10	0	10	0	20	0	30	0	40	0	50	0	60	0	70	0	80	0	90	1	00
11	0	11	0	22	0	33	0	44	0	55	0	66	0	77	0	88	0	99	1	10
12	0	12	0	24	0	36	0	48	0	60	0	72	0	84	0	96	1	08	1	20
13	0	13	0	26	0	39	0	52	0	65	0	78	0	91	1	04	1	17	1	30
14	0	14	0	28	0	42	0	56	0	70	0	84	0	98	1	12	1	26	1	40
15	0	15	0	30	0	45	0	60	0	75	0	90	1	05	1	20	1	35	1	50
16	0	16	0	32	0	48	0	64	0	80	0	96	1	12	1	28	1	44	1	60
17	0	17	0	34	0	51	0	68	0	85	1	02	1	19	1	36	1	53	1	70
18	0	18	0	36	0	54	0	72	0	90	1	08	1	26	1	44	1	62	1	80
19	0	19	0	38	0	57	0	76	0	95	1	14	1	33	1	52	1	71	1	90
20	0	20	0	40	0	60	0	80	1	00	1	20	1	40	1	60	1	80	2	00
21	0	21	0	42	0	63	0	84	1	05	1	26	1	47	1	68	1	89	2	10
22	0	22	0	44	0	66	0	88	1	10	1	32	1	54	1	76	1	98	2	20
23	0	23	0	46	0	69	0	92	1	15	1	38	1	61	1	84	2	07	2	30
24	0	24	0	48	0	72	0	96	1	20	1	44	1	68	1	92	2	16	2	40
25	0	25	0	50	0	75	1	00	1	25	1	50	1	75	2	00	2	25	2	50
26	0	26	0	52	0	78	1	4	1	36	1	56	1	82	2	08	2	34	2	60
27	0	27	0	54	0	81	1	8	1	35	1	62	1	89	2	16	2	43	2	70
28	0	28	0	56	0	84	1	12	1	40	1	68	1	96	2	24	2	52	2	80
29	0	29	0	58	0	87	1	16	1	45	1	74	2	03	2	32	2	61	2	90
30	0	30	0	60	0	90	1	20	1	50	1	80	2	10	2	40	2	70	3	00

A Table for finding the Content in Squares.

Breadth in Feet.

Length in Feet.	11		12		13		14		15		16		17		18		19		20	
	S.	F.	S.	F.	S.	F.	S.	F.	S.	F.	S.	F.	S.	F.	S.	F.	S.	F.	S.	F.
1	0	11	0	12	0	13	0	14	0	15	0	16	0	17	0	18	0	19	0	20
2	0	22	0	24	0	26	0	28	0	30	0	32	0	34	0	36	0	38	0	40
3	0	33	0	36	0	39	0	42	0	45	0	48	0	51	0	54	0	57	0	60
4	0	44	0	48	0	52	0	56	0	60	0	64	0	68	0	72	0	76	0	80
5	0	55	0	60	0	65	0	70	0	75	0	80	0	85	0	90	0	95	1	00
6	0	66	0	72	0	78	0	84	0	90	0	96	1	2	1	08	1	14	1	20
7	0	77	0	84	0	91	0	98	1	5	1	12	1	19	1	26	1	33	1	40
8	0	88	1	96	1	4	1	12	1	20	1	28	1	36	1	44	1	52	1	60
9	0	99	1	08	1	17	1	26	1	35	1	44	1	53	1	62	1	71	1	80
10	1	10	1	20	1	30	1	40	1	50	1	60	1	70	1	80	1	90	2	00
11	1	21	1	32	1	43	1	54	1	65	1	76	1	87	1	98	2	09	2	20
12	1	32	1	44	1	56	1	68	1	80	1	92	2	04	2	16	2	28	2	40
13	1	43	1	56	1	69	1	82	1	95	2	8	2	21	2	34	2	47	2	60
14	1	54	1	68	1	82	1	96	2	10	2	24	2	38	2	52	2	66	2	80
15	1	65	1	80	1	95	2	10	2	25	2	40	2	55	2	70	2	85	3	00
16	1	76	1	92	2	8	2	24	2	40	2	56	2	72	2	88	3	04	3	20
17	1	87	2	04	2	21	2	38	2	55	2	72	2	89	3	6	3	23	3	40
18	1	98	2	16	2	34	2	52	2	70	2	88	3	06	3	24	3	42	3	60
19	2	09	2	28	2	47	2	66	2	85	3	4	3	23	3	42	3	61	3	80
20	2	20	2	40	2	60	2	80	3	00	3	20	3	40	3	60	3	80	4	00
21	2	31	2	52	2	73	2	94	3	15	3	36	3	57	3	78	3	99	4	20
22	2	42	2	64	2	86	3	8	3	30	3	52	3	74	3	96	4	18	4	40
23	2	53	2	76	2	99	3	22	3	45	3	68	4	91	4	14	4	37	4	60
24	2	64	3	88	3	12	3	36	3	60	3	84	4	08	4	32	4	56	4	80
25	2	75	3	00	3	25	3	50	3	75	4	00	4	25	4	50	4	75	5	00
26	2	86	3	12	3	38	3	64	3	90	4	16	4	42	4	68	4	94	5	20
27	2	97	3	24	3	51	3	78	4	5	4	32	4	59	4	86	5	13	5	40
28	3	08	3	36	3	64	3	92	4	20	4	48	5	76	5	4	5	32	5	60
29	3	19	3	48	3	77	4	6	4	35	4	64	5	93	5	22	5	51	5	80
30	3	30	3	60	3	90	4	20	4	50	4	80	5	10	5	40	5	70	6	00

The Uſe of all the Preceding Tables.

Tho' little need be ſaid concerning the uſe of the foregoing Tables, in reſpect of their being ſo very plain; notwithſtanding an Example in each Table cannot be amiſs, which take as followeth.

The Uſe of the Table of Board Meaſure.

Find the breadth of the Board in Inches in the top, in its reſpective Columne, and the length in Feet on the left hand as the Table directs, and in the *Angle* of meeting is the Content in Feet and Parts.

Examp. Of a Board whoſe breadth is 16 Inches, and the length 15 Foot, enter the Table as before directed, and in the *Angle* of meeting is found 20.0 that is juſt 20 foot; if the ſame Board had been 17 inches broad, the Content would have been 21.2, that is 21 foot $\frac{2}{10}$ of a foot: the next Table of Board Meaſure explains it ſelf.

The Uſe of the Table of Diameters and Circumferences.

This Table by having the Diameters, the Circumference may be found; or by having the Circumference the Diameter may be had, againſt which ſtands the *Aare* of the Circle agreeing to that Diameter and Circumference.

Examp. Suppoſe the Diameter given be 44.6, the Circumference anſwering that Diameter, is 140.0, and the *Aare* of the Circle agreeing with this Diameter and Circumference, is 1561.0, whether in Yards, Feet or Inches, according to the Dimenſions given. Again, ſuppoſe the Circumference given, be 80.4, the Diameter anſwering, will be found 15.6, and the *Aare* of the Circle correſponding, 514.56.

The

The Uſe of the Table ſhewing the Aares of Squares, Triangles and Trapezia's.

This Table is of excellent uſe in finding the *Aare* of any Square Superficies, long Square, Triangles, Trapezia's, or other irregular figures. The Dimenſions being taken in Inches, and entered in the Table, gives the Content in Feet and 100 Parts, as we ſhall hear exemplifie in the aforeſaid figures, and firſt of the Parallellogram or long Square, whoſe length we will here ſuppoſe 97 Inches, and the breadth 61 Inches; firſt then enter the Table with 90 on the left hand, and 61 the breadth in the top, and in the *Angle* of meeting is 37.45, then under the ſame heighth enter the left hand page with 7, and in the meeting Angle is 2.98 which added to 37,45 gives 40.43 ſo the Superficial Content of the aforeſaid long Square.

The Content of a Triangle is found by entering the *Table* with half the Baſe, and the whole of the Perpendicular, or by half the Perpendicular, and whole of the Baſe.

Admit a Triangle whoſe Baſe is 106 inches, and the Perpendicular 64 inches, which either way the Superficial Content is found as followeth.

I. *Examp.* By having half the Baſe and the whole Perpendicular.

Half the Baſe 50 and 3 } gives under 64 { 22.22 / 1.34

Aare of the Triangle in Feet ——— 23.56

II. *Examp.* By having the whole *Baſe* and half Perpendicular.

Whole *Baſe* 100 and 6 } gives under 32 { 22.22 / 1.34

Aare as before in Feet and ——— 23.56 Parts.

A Trapezia divided into two Triangles, each *Triangles* Content may be found by the preceding directions; and likewiſe any irregular figure whatſoever, being divided into *Triangles*, the Content of each *Triangle* being found as before, and the Aares of all the *Triangles* added together, which ſum is the Content of the irregular figure deſired.

The Uſe of the Table of Rood Meaſure.

This Table being entered with the length in Feet, and under the heighth and breadth in Feet in the top of the Table, and in the Angle of meeting is the content in Roods, Yards, and Feet.

Let it be required to find how many Roods, Yards, and Feet is contained in that Wall whoſe length is 245 Foot, and the heighth 14 Foot.

			R.	Y.	F.
Ex.	Length 240 and 5	under 14 the height	10	13	03
			0	7	7
The Content			10	21	01

The Uſe of the Table of Yard Meaſure.

The Uſe of this *Table* is to find the Content of any Wainſcot, Painting, or ſuch like, whoſe Content is required in Yards; the length being given in Inches, and the heighth in Feet and Inches; the ſame method is to be obſerved for finding the Content as in the laſt, but to make it clear, we will take in one Example, which let be the ſide of a Room Wainſcoted, Painted, *&c.* whoſe length is 234 Inches, and the heighth 8 Foot 4 Inches, with which two numbers enter the *Table*, and the Content will be found 18 Yards 0 Foot $\frac{12}{100}$ Parts.

Ex.

				Y.	F.	P.
Ex.	Length 230 and 45	gives under	8 Foot 4 Inches.	17	6	72
				0	2	78
The Content				18	0	50

The Use of the *Table* of Foot Measure for Glass, *&c.* the length being given in Inches, and the breadth in Inches and tenths of an Inch, with which enter the *Table* as the *Title* directs, and in the Angle of meeting is the Content in Feet and Parts of a Foot, for instance, we will suppose a Pain of Glass to be in length 64 Inches, and in breadth 15. 4 Inches, that is 15 Inches and $\frac{4}{10}$ of an Inch, the Content will be found to be 6 Foot $\frac{43}{100}$ Parts of a Foot, as followeth

Examp.	Length 60 and 45	gives under	15.4	6	43
				0	43
The Content				6	86

The Use of the Tables of Squares.

This *Table* is for finding the Content of Floors laid with Boards, *&c.* the Content being commonly required in Squares; each Square containing 100 Foot. The *Table* being entered with the length and breadth in Feet, gives in the Angle of meeting the Content in Squares and Feet or 100 parts of a Square.

Examp. Of a *Floor* laid with Board whose length is 16 foot and the breadth 14 foot; find 16 the length in the first Collume on the left hand, and 14 the breadth in the top of the Table, and in the Angle of meeting is 2.24, that is 2 Squares and 24 foot or parts of a Square, or 224 foot.

This Table is of Excellent use in finding the Content of any Superficies in feet that exceeds not the limits of the Table.

Examp. Of a *Floor* laid with Pavement whose length is 20 foot, and the breadth 18 foot, with which enter the Table as before, which produces the Content 360 foot.

Roots	0	1	2	3	4
1	1. 00	1. 21	1. 44	1. 69	1. 96
2	4. 00	4. 41	4. 84	5. 29	5. 76
3	9. 00	9. 61	10. 24	10. 89	11. 56
4	16. 00	16. 81	17. 64	18. 49	19. 36
5	25. 00	26. 01	27. 04	28. 09	29. 16
6	36. 00	37. 21	38. 44	39. 69	40. 96
7	49. 00	40. 41	51. 84	53 29	54 76
8	64. 00	65. 61	67. 24	68. 89	70. 56
9	81. 00	82. 81	84. 64	86. 49	88. 36
10	100. 00	102. 01	104. 04	106. 09	108. 16
11	121. 00	123. 21	125. 44	187. 69	129. 96
12	144. 00	146. 41	148. 84	151. 29	153. 76
13	169. 00	171. 61	174. 24	176. 89	179. 56
14	196. 00	198. 81	201. 64	204. 49	207. 36
15	225. 00	228. 01	231. 04	234. 09	237. 16
16	256. 00	259. 21	262. 44	265. 69	268. 96
17	289. 00	292. 41	295. 84	299. 29	302. 76
18	324. 00	327. 61	331. 24	334. 89	338. 56
19	361. 00	364. 81	368. 64	372. 49	376. 36
20	400. 00	404. 01	408. 04	412. 09	416. 16
21	441. 00	445. 21	449. 44	453. 69	457. 96
22	484. 00	488. 41	492 84	497. 29	501. 76
23	529. 00	533. 61	538 24	542. 89	547. 56
24	576. 00	580. 81	585 64	590. 49	595. 36
25	625. 00	530. 01	635 04	640. 09	645. 16
26	676. 00	681. 21	686 44	691. 69	696. 96
27	729. 00	734. 41	739 84	745. 29	750. 76
28	784. 00	789. 61	795 24	800. 89	806. 56
29	841. 00	846. 81	852 64	858. 49	864. 36
30	900. 00	906, 01	912 04	918. 09	924. 16
31	961. 00	967. 21	973 44	979. 69	985. 96
32	1024. 00	1030. 41	1036 84	1043. 29	1049. 76
33	1089. 00	1095. 61	1102 24	1108. 89	1115. 56
34	1156. 00	1162. 81	1169 64	1176. 49	1183. 36
35	1225. 00	1232. 01	1239 04	1206. 09	1243. 16

Root.	5	6	7	8	9
1	2. 25	2. 16	2. 89	3. 24	3. 61
2	6. 25	6. 76	7. 29	7. 84	8. 41
3	12. 25	12. 96	13. 69	14. 44	15. 21
4	20. 25	21. 16	22. 09	23. 04	24. 01
5	30 25	31: 36	32. 49	33. 64	34. 81
6	42. 25	43. 56	44. 89	46. 24	47. 61
7	56. 25	57. 76	59. 29	60. 84	62. 41
8	72. 25	73. 96	75. 69	77. 44	79. 21
9	90. 25	92. 16	94. 09	96. 04	98. 01
10	110. 25	112. 36	114. 49	116. 64	118. 81
11	132. 25	134. 56	136. 89	139. 24	141. 61
12	150. 25	158. 76	161. 29	163. 84	166. 41
13	182. 25	184. 96	187. 69	190. 44	193. 21
14	210. 25	213. 16	216. 09	219. 04	222. 01
15	240. 25	243. 36	246. 49	249. 64	252. 81
16	272. 25	275. 56	278. 89	282. 24	285. 61
17	306. 25	309. 76	313. 29	310. 84	320. 41
18	342. 25	345. 56	349. 69	353. 44	357. 21
19	380. 25	384. 16	388. 09	392. 04	396. 01
20	420. 25	424. 36	428. 49	432. 64	436. 81
21	462. 25	466. 56	470. 89	475. 24	479. 61
22	506. 25	510. 76	515. 29	519. 84	524. 41
23	552. 25	556. 96	561. 69	566. 44	571. 21
24	600. 25	605. 16	610. 09	715. 04	620. 01
25	650. 25	655. 36	660. 49	605. 64	670. 81
26	702. 25	707. 56	712. 89	718. 24	713. 61
27	756. 25	761. 76	767. 29	772. 84	778. 41
28	812. 25	817. 96	823. 69	829. 44	835. 21
29	870. 25	876. 16	882. 09	888. 04	894. 01
30	930. 25	936. 36	942. 49	948. 64	954. 81
31	992. 25	998. 56	1004. 89	1011. 24	1017. 61
32	1056. 25	1062. 76	1059. 29	1075. 84	1082. 41
33	1122. 25	1128. 96	1135. 69	1143. 44	1149. 21
34	1190. 25	1197. 16	1204. 09	1211. 04	1218. 01
35	1260. 25	1267. 36	1274. 49	1218. 64	1288. 81

A Table of Square Roots.

The Root.	0	1	2	3	4
36	1296. 00	1303. 21	1310. 44	1317. 69	1324. 96
37	1369. 00	1376. 41	1383. 84	1391. 29	1398. 76
38	1444. 00	1451. 61	1459. 24	1466. 89	1474. 56
39	1521. 00	1528. 81	1536. 64	1544. 49	1552. 56
40	1600. 00	1608. 01	1616. 04	1624. 09	1632. 16
41	1681. 00	1689. 21	1697. 44	1705. 69	1713. 96
42	1764. 00	1772. 41	1780. 84	1789. 29	1797. 76
43	1849. 00	1857. 61	1866. 24	1874. 89	1883. 56
44	1936. 00	1944. 81	1953. 64	1962. 49	1971. 36
45	2025. 00	2034. 01	2043. 04	2052. 09	2061. 16
46	2116. 00	2125. 21	2134. 44	2143. 69	2152. 96
47	2209. 00	2218. 41	2227. 84	2237. 29	2246. 76
48	2304. 00	2314. 61	2323. 24	2332. 89	2342. 56
49	2401. 00	2410. 81	2420. 64	2430. 49	2440. 36
50	2500. 00	2510. 01	2520. 04	2530. 09	2540. 16
51	2601. 00	2611. 21	2621. 44	2631. 69	2641. 96
52	2734. 00	2714. 41	2724. 84	2735. 29	2745. 76
53	2809. 00	2819. 61	2830. 24	2840. 89	2851. 56
54	2916. 00	2926. 81	2937. 64	2948. 49	2959. 36
55	3025. 00	3036. 01	3047. 04	3058. 09	3069. 16
56	3136. 00	3147. 21	3158. 44	3169. 69	3180. 96
57	3249. 00	3260. 41	3271. 84	3283. 29	3294. 76
58	3364. 00	3375. 61	3387. 24	3398. 89	3410. 56
59	3481. 00	3492. 81	3504. 64	3516. 49	3528. 36
60	3600. 00	3612. 01	3624. 04	3636. 09	3648. 16
61	3721. 00	3733. 21	3745. 44	3757. 69	3769. 96
62	3844. 00	3856. 41	3868. 84	3881. 29	3893. 76
63	3969. 00	3981. 61	3994. 24	4006. 89	4019. 56
64	4096. 00	4108. 81	4121. 64	4134. 49	4147. 36
65	4225. 00	4238. 01	4251. 04	4264. 09	4277. 16
66	4356. 00	4369. 21	4382. 44	4395. 69	4408. 96
67	4489. 00	4502. 41	4515. 84	4529. 29	4542. 76
68	4624. 00	4637. 61	4651. 24	4664. 89	4678. 56
69	4761. 00	4774. 81	4788. 64	4802. 49	4816. 36
70	4900. 00	4914. 01	4928. 04	4942. 09	4956. 16

A Table of Square Roots.

The Root.	5		6		7		8		9	
36	1332.	25	1339.	56	1346.	89	1354.	24	1361.	61
37	1406.	25	1413.	76	1421.	29	1428.	84	1436.	41
38	1482.	25	1489.	96	1497.	69	1505.	44	1513.	21
39	1560.	25	1568.	16	1576.	09	1584.	04	1592.	01
40	1640.	25	1648.	36	1656.	49	1664.	64	1672.	81
41	1722.	25	1730.	56	1738.	89	1747.	24	1755.	61
42	1806.	25	1814.	76	1823.	29	1831.	84	1840.	41
43	1892.	25	1900.	96	1909.	69	1918.	44	1927.	21
44	1980.	25	1989.	16	1998.	09	2007.	04	2016.	01
45	2070.	25	2079.	36	2088.	49	2097.	64	2106.	81
46	2162.	25	2171.	56	2180.	89	2190.	24	2199.	61
47	2256.	25	2265.	76	2275.	29	2284.	84	2294.	41
48	2352.	25	2361.	96	2371.	69	2381.	44	2391.	21
49	2450.	25	2460.	16	2470.	09	2480.	04	2490.	01
50	2550.	25	2560.	36	2570	49	2580.	64	2590.	81
51	2652.	25	2662.	56	2672.	89	2683.	24	2693.	61
52	2756.	25	2766.	76	2777.	29	2787.	84	2798.	41
53	2862.	25	2872.	96	2883.	69	2894.	44	2905.	21
54	2970.	25	2981.	16	2992.	09	3003.	04	3014.	01
55	3080.	25	3091.	36	3102.	49	3113.	64	3124.	81
56	3192.	25	3203.	56	3214.	89	3226.	24	3237.	61
57	3306.	25	3317.	76	3329.	29	3340.	84	3352.	41
58	3422.	25	3433.	96	3445.	69	3457.	44	3469.	21
59	3540.	25	3552.	16	3564.	09	3576.	04	3588.	01
60	3660.	25	3672.	36	3684.	49	3696.	64	3708.	81
61	3782.	25	3794.	56	3806.	89	3819.	24	3831.	61
62	3906.	25	3918.	76	3931.	29	3943.	84	3956.	41
63	4032.	25	4044.	96	4057.	69	4070.	44	4083.	21
64	4160.	25	4173.	16	4186.	09	4199.	04	4212.	01
65	4290.	25	4303.	36	4316.	49	4329.	64	4342.	81
66	4422.	25	4435.	56	4448.	89	4461.	24	4475.	61
67	4556.	25	4569.	76	4583.	29	4596.	84	4610.	41
68	4692.	25	4705.	96	4719.	69	4733.	44	4747.	21
69	4830.	25	4844.	16	4858.	09	4872.	04	4886.	01
70	4970.	25	4984.	36	4998.	49	5012.	64	5026.	81

A Table of Square Roots.

The Root.	0	1	2	3	4
71	5041. 00	5055. 21	5069. 44	5083. 69	5097. 96
72	5184. 00	5198. 41	5212. 84	5227. 29	5241. 76
73	5329. 00	5343. 61	5358. 24	5372. 89	5387. 56
74	5476. 00	5490. 81	5505. 64	5520. 49	5535. 36
75	5625. 00	5640. 01	5655. 04	5670. 09	5685. 16
76	5776. 00	5791. 21	5806. 44	5821. 69	5836. 96
77	5929. 00	5944. 41	5959. 84	5975. 29	5990. 76
78	6034. 00	6099. 61	6115. 24	6130. 89	6146. 56
79	6241. 00	6256. 81	6272. 64	6288. 49	6304. 36
80	6400. 00	6416. 01	6432. 04	6448. 09	6464. 16
81	6561. 00	6577. 21	6593. 44	6609. 69	6625. 96
82	6724. 00	6740. 41	6756. 84	6773. 29	6789. 76
83	6889. 00	6905. 61	6922. 24	6938. 89	6955. 56
84	7056. 00	7072. 81	7089. 64	7106. 49	7123. 36
85	7225. 00	7242. 01	7259. 04	7276. 09	7293. 16
86	7396. 00	7413. 21	7430. 44	7447. 69	7464. 96
87	7569. 00	7586. 41	7603. 84	7621. 29	7638. 76
88	7744. 00	7761. 61	7779. 24	7796. 89	7814. 56
89	7921. 00	7938. 81	7956. 64	7974. 49	7992. 36
90	8100. 00	8118. 01	8136. 04	8154. 09	8172. 16
91	8281. 00	8299. 21	8317. 44	8335. 69	8353. 96
92	8464. 00	8482. 41	8500. 84	8519. 29	8537. 76
93	8649. 00	8667. 61	8686. 24	8704. 89	8723. 56
94	8836. 00	8854. 81	8873. 64	8892. 49	8911. 36
95	9025. 00	9044. 01	9063. 04	9082. 09	9101. 16
96	9216. 00	9235. 21	9254. 44	9273. 69	9292. 96
97	9409. 00	9428. 41	9447. 84	9467. 29	9486. 76
98	9604. 00	9623. 61	9643. 24	9662. 89	9682. 56
99	9801. 00	9820. 81	9840. 64	9860. 49	9880. 36
100	10000. 00	10020. 01	10040. 04	10060. 09	10080 16
101	10201. 00	10221. 21	10241. 44	10261. 69	10281. 96
102	10404. 00	10424. 41	10444. 84	10465. 29	10485. 76
103	10609. 00	10629 61	10650. 24	10670. 89	10691. 56
104	10816. 00	10836. 81	10857. 64	10878. 49	19899. 36
105	11025. 00	11046. 01	11067. 04	11088. 09	11109. 16

A Table of Square Roots.

The Root.	5		6		7		8		9	
71	5112.	25	5126.	56	5140.	89	5155.	24	5169.	61
72	5256.	25	5270.	76	5285.	29	5299.	84	5314.	41
73	5402.	25	5416.	96	5431.	69	5446.	44	5461.	21
74	5550.	25	5565.	16	5580.	09	5595.	04	5610.	01
75	5700.	25	5715.	36	5730.	49	5745	64	5760.	81
76	5852.	25	5867.	56	5882.	89	5898.	24	5913.	61
77	6006.	25	6021.	76	6037.	29	6052.	84	6068.	41
78	6162.	25	6177.	96	6193.	69	6209.	44	6225.	21
79	6320.	25	6336.	16	6352.	09	6368.	04	6384.	01
80	6480.	25	6496.	36	6512.	49	6528.	64	6544.	81
81	6642.	25	6658.	56	6674.	89	6699.	24	6707.	61
82	6806.	25	6822.	76	6839.	29	6855.	84	6872.	41
83	6972.	25	6988.	96	7005.	69	7022.	44	7039.	21
84	7140.	25	7157.	16	7174.	09	7191.	04	7208.	01
85	7310.	25	7327.	36	7344.	49	7361.	64	7378.	81
86	7482.	25	7499.	56	7516.	89	7534.	24	7551.	61
87	7656.	25	7673.	76	7691.	29	7708.	84	7726.	41
88	7832.	25	7849.	96	7867.	69	7885.	44	7903.	21
89	8010.	25	8028.	16	8046.	09	8064.	04	8082.	01
90	8190.	25	8208.	36	8226.	49	8244.	64	8262.	81
91	8372.	25	8390.	56	8408.	89	8427.	24	8445.	61
92	8556.	25	8574.	76	8593.	29	8611.	84	8630.	41
93	8742.	25	8760.	96	8779.	69	8798.	44	8817.	21
94	8930.	25	8949.	16	8968.	09	8987.	04	9006.	01
95	9120.	25	9139.	36	9158.	49	9177.	64	9196.	81
96	9312.	25	9331.	56	9350.	89	9370.	24	9389.	61
97	9506.	25	9525.	76	9545.	29	9564.	84	9584.	41
98	9702.	25	9721.	96	9741.	69	9761.	44	6781.	21
99	9900.	25	9920.	16	9940.	09	9960.	04	9980.	01
100	10100.	25	10120.	36	10140.	49	10160.	64	10180.	81
101	10302.	25	10302.	56	10342.	89	10363.	24	10383.	61
102	10506.	25	10526.	76	10547.	29	10567.	84	10588.	41
103	10712.	25	10732.	96	10753.	69	10774.	44	10595.	21
104	10920.	25	10941.	16	10962.	09	10983.	04	11004.	01
105	11130.	25	11151.	36	11172.	49	11193.	64	11214.	81

A Table of Square Roots.

The Root.	0	1	2	3	4
106	11236. 00	11257. 21	11278. 44	11299. 69	11320. 96
107	11449. 00	11470. 41	11491. 84	11513. 29	11534. 76
108	11664. 00	11685. 61	11707. 24	11728. 89	11750. 56
109	11881. 00	11902. 81	11924. 64	11946. 49	11968. 36
110	12100. 00	12122. 01	12144. 04	12166. 09	12188. 16
111	12321. 00	12343. 21	12365. 44	12387. 69	11409. 96
112	11544. 00	12566. 41	12588. 84	12611. 29	12633. 76
113	12769. 00	12791. 61	12814. 24	12836. 89	12859. 56
114	12966. 00	13018. 81	13041. 64	13064. 49	13087. 36
115	13225. 00	13248. 01	13271. 04	13294. 09	13317. 16
116	13456. 00	13479. 21	13502. 44	13525. 69	13548. 96
117	13689. 00	13712. 41	13735. 84	13759. 29	13782. 76
118	13924. 00	13947. 61	13971. 24	13994. 89	14018. 56
119	14161. 00	14184. 81	14208. 64	14232. 49	14256. 36
120	14400. 00	14424. 01	14448. 04	14472. 09	14496. 16
121	14641. 00	14665. 21	14689. 44	14713. 69	14737. 96
122	14884. 00	14908. 41	14932. 84	14957. 29	14981. 76
123	15129. 00	15153. 61	15178. 24	15202. 89	15227. 56
124	15376. 00	15400. 81	15425. 64	15450. 49	15475. 36
125	15625. 00	15650. 01	15575. 04	15700. 09	15725. 16
126	15876. 00	15901. 21	15926. 44	15951. 69	15976. 96
127	16129. 00	16154. 41	16179. 84	16205. 29	16230. 76
128	16384. 00	16407. 61	16435. 24	16460. 89	16486. 56
129	16641. 00	16666. 81	16692. 64	16718. 49	16744. 36
130	16900. 00	16926. 01	16952. 04	16978. 09	17004. 16
131	17161. 00	17187. 21	17213. 44	17239. 69	17265. 96
132	17424. 00	17450. 41	17476. 84	17503. 29	17529. 76
133	17689. 00	17715. 61	17742. 24	17768. 89	17795. 56
134	17956. 00	17982. 81	18009. 64	18036. 49	18063. 36
135	18225. 00	18252. 01	18279. 04	18306. 09	18333. 16
136	18496. 00	18523. 21	18550. 44	18577. 69	18604. 96
137	18769. 00	18796. 41	18823. 84	18851. 29	18878. 76
138	19044. 00	19071. 61	19099. 24	19126. 89	19154. 56
139	19321. 00	19348. 81	19376. 64	19404. 49	19432. 36
140	19600. 00	19628. 01	19656. 04	19684. 09	19712. 16

A Table of Square Roots.

5		6		7		8		9	
11942.	25	11363.	56	11384.	89	11406.	24	11427.	61
11556.	25	11577.	76	11599.	29	11620.	84	11642.	01
11771.	25	11793.	96	11815.	69	11837.	44	11859.	21
11990.	25	12012.	16	12034.	09	12056.	04	12078.	01
12210.	25	12232.	36	12254.	49	12276.	64	12298.	81
12432.	25	12454.	56	12476.	89	12499.	24	12521.	61
12656.	25	12678.	76	12701.	29	12723.	84	12746.	41
12882.	25	12904.	96	12927.	69	12950.	44	12973.	21
13110.	25	13133.	16	13156.	09	131 9.	04	13202.	01
13340.	25	13363.	36	13386.	49	13409.	64	13432.	81
13572.	25	13595.	56	13618.	89	13642.	24	13665.	61
13806.	25	13829.	76	13852.	29	13876.	84	13900.	41
14042.	25	14065.	96	14089.	69	14113.	44	14139.	21
14280.	25	14303.	16	14328.	09	14352.	04	14376.	01
14520.	25	14544.	36	14568.	49	14592.	64	14616.	81
14762.	25	14787.	56	14812.	89	14835.	24	14859.	61
15006.	25	15030.	76	15055.	29	15079.	84	15104.	41
15252.	25	15276.	96	15301.	69	15326.	44	15351.	21
15500.	25	15525.	16	15550.	09	15575.	04	15600.	01
15750.	25	15777.	36	15801.	49	15824.	64	15850.	81
16002.	25	16027.	56	16052.	89	16076.	24	16101.	61
16256.	25	16282.	76	16307.	29	16332.	84	16358.	41
16512.	25	16537.	96	16563.	69	16589.	44	16615.	21
16770.	25	16796.	16	16822.	09	16848.	04	16874.	01
17030.	25	17056.	36	17082.	49	17108.	64	17134.	81
17292.	25	17318.	56	17344.	89	17370.	24	17397.	61
17556.	25	17582.	76	17609.	29	17635.	84	17662.	41
17822.	25	17848.	96	17875.	69	17902.	44	17929.	21
18090.	25	18117.	16	18144.	09	18171.	04	18198.	01
18360.	25	18387.	36	18414.	49	18441.	64	18468.	81
18632.	25	18659.	56	18686.	89	18713.	24	18741.	61
18906.	25	18933.	76	18961.	29	18988.	84	19016.	41
19181.	25	19209.	96	19238.	69	19265.	44	19293.	21
19460.	25	19488.	16	19516.	09	19544.	04	19572.	01
19740.	25	19768.	36	19796.	49	19824.	64	19852.	81

	The true Squaze in inches							
	6	7	8	9	10	11	12	13
(1)	0 25	0 34	0 45	0 56	0 70	0 85	1 0	1 17
2	0 30	0 41	0 54	0 68	0 84	1 1	1 20	1 41
4	0 35	0 48	0 63	0 79	0 98	1 17	1 40	1 65
6	0 40	0 55	0 72	0 90	1 12	1 33	1 60	1 89
8	0 45	0 62	0 81	1 1	1 26	1 49	1 80	2 13
(2)	0 50	0 69	0 90	1 13	1 40	1 65	2 0	2 30
2	0 55	0 75	0 99	1 24	1 54	1 81	2 20	2 54
4	0 60	0 82	1 7	1 35	1 67	1 97	2 40	2 82
6	0 65	0 89	1 16	1 46	1 81	2 14	2 60	3 6
8	0 70	0 96	1 25	1 58	1 95	2 31	2 80	3 30
(3)	0 75	1 3	1 34	1 69	2 9	2 48	3 0	3 53
2	0 80	1 10	1 43	1 80	2 23	2 65	3 20	3 77
4	0 85	1 17	1 52	1 91	2 37	2 82	3 40	4 0
6	0 90	1 23	1 61	2 2	2 51	2 99	3 60	4 23
8	0 95	1 30	1 70	2 14	2 65	3 16	3 80	4 47
(4)	1 0	1 37	1 78	2 25	2 79	3 33	4 0	4 70
2	1 5	1 44	1 87	2 36	2 92	3 50	4 20	4 94
4	1 10	1 51	1 96	2 47	3 6	3 67	4 40	5 17
6	1 15	1 57	2 5	2 59	3 20	3 84	4 60	5 41
8	1 20	1 64	2 14	2 70	3 34	4 1	4 80	5 64
(5)	1 25	1 71	2 23	2 81	3 48	4 18	5 0	5 88
2	1 30	1 78	2 32	2 92	3 62	4 35	5 20	6 11
4	1 35	1 85	2 41	3 3	3 76	4 52	5 40	6 35
6	1 40	1 91	2 50	3 15	3 90	4 69	5 60	6 58
8	1 45	1 98	2 58	3 26	4 4	4 86	5 80	6 81
(6)	1 50	2 5	2 67	3 37	4 17	5 3	6 0	7 4
2	1 55	2 12	2 76	3 48	4 31	5 20	6 20	7 28
4	1 60	2 19	2 85	3 59	4 45	5 37	6 40	7 52
6	1 65	2 25	2 94	3 71	4 59	5 54	6 60	7 75
8	1 70	2 32	3 3	3 82	4 73	5 71	6 80	7 99
(7)	1 75	2 39	3 12	3 94	4 87	5 88	7 0	8 23
2	1 80	2 46	3 21	4 5	5 1	6 5	7 20	8 47
4	1 85	2 53	3 30	4 16	5 16	6 22	7 40	8 69
6	1 90	2 60	3 38	4 27	5 28	6 39	7 60	8 93
8	1 95	2 66	3 47	4 38	5 42	6 56	7 80	9 17

The true Square in Inches.								
5	6	7	8	9	10	11	12	13
(8)	2 0	2 73	3 50	4 50	5 56	6 73	8 0	9 39
2	2 5	2 80	3 65	4 62	5 70	6 90	8 20	9 63
4	2 10	2 87	3 74	4 73	5 84	7 7	8 40	9 87
6	2 15	2 94	3 83	4 84	5 98	7 24	8 60	10 10
8	2 20	3 1	3 92	4 95	6 12	7 40	8 80	10 33
(9)	2 25	3 8	4 1	5 7	6 26	7 57	9 0	10 57
2	2 30	3 15	4 10	5 18	6 40	7 74	9 20	10 80
4	2 35	3 21	4 19	5 29	6 54	7 91	9 40	11 8
6	2 40	3 28	4 28	5 41	6 67	8 8	9 60	11 29
8	2 45	3 35	4 36	5 52	6 81	8 24	9 80	11 52
(10)	2 50	3 42	4 45	5 63	6 95	8 41	10 0	11 75
2	2 55	3 48	4 54	5 74	7 9	8 58	10 20	11 97
4	2 60	3 55	4 63	5 86	7 23	8 75	10 40	12 20
6	2 65	3 62	4 72	5 97	7 37	8 92	10 60	12 43
8	2 70	3 69	4 81	6 1	7 51	9 8	10 80	12 67
(11)	2 75	3 75	4 90	6 19	7 65	9 25	11 0	12 90
2	2 80	3 82	4 99	6 31	7 78	9 42	11 20	13 13
4	2 85	3 89	5 7	6 42	7 92	9 59	11 40	13 36
6	2 90	3 96	5 16	6 53	8 6	9 76	11 60	13 60
8	2 95	4 2	5 25	6 64	8 20	9 93	11 80	13 83
(12)	3 0	4 9	5 34	6 75	8 34	10 10	12 0	14 7
2	3 5	4 16	5 43	6 87	8 48	10 26	12 20	14 30
4	3 10	4 23	5 52	6 98	8 62	10 43	12 40	14 54
6	3 15	4 29	5 61	7 10	8 76	10 60	12 60	14 77
8	3 20	4 36	5 70	7 19	8 90	10 76	12 80	15 1
(13)	3 25	4 43	5 79	7 31	9 3	10 93	13 0	15 24
2	3 30	4 50	5 87	7 43	9 17	11 10	13 20	15 48
4	3 35	4 57	5 96	7 54	9 31	11 27	13 40	15 72
6	3 40	4 64	6 5	7 66	9 45	11 44	13 60	15 95
8	3 45	4 70	6 14	7 77	9 59	11 60	13 80	16 19
(14)	3 50	4 77	6 23	7 88	9 73	11 77	14 0	16 42
2	3 55	4 84	6 32	8 0	9 87	11 94	14 20	16 66
4	3 60	4 90	6 41	8 10	10 1	12 11	14 40	16 90
6	3 65	4 97	6 50	8 21	10 14	12 28	14 60	17 14
8	3 70	5 3	6 58	8 33	10 28	12 45	14 80	17 37

A Table of Solids.

Leng. in F. & P.	The true Square in Inches.							
	6	7	8	9	10	11	12	13
(15)	3 76	5 10	6 67	8 44	10 42	12 60	15	17 60
2	3 80	5 17	6 76	8 55	10 56	12 77	15	17 84
4	3 85	5 24	6 85	8 66	10 70	12 94	15	18 7
6	3 91	5 30	6 94	8 77	10 84	13 10	15	18 31
8	3 96	5 37	7 3	8 89	10 98	13 27	15	18 54
(16)	4 1	5 44	7 12	9 0	11 11	13 44	16	18 78
2	4 6	5 51	7 21	9 11	11 25	13 61	16	19 2
4	4 11	5 58	7 30	9 22	11 39	13 78	16	19 26
6	4 16	5 64	7 38	9 34	11 53	13 96	16	19 49
8	4 21	5 71	7 47	9 45	11 67	14 11	16	19 73
(17)	4 26	5 78	7 56	9 56	11 81	14 28	17 0	19 96
2	4 31	5 85	7 65	9 68	11 96	14 45	17	20 19
4	4 36	5 92	7 74	9 79	12 9	14 62	17	20 43
6	4 41	5 99	7 83	9 90	12 23	14 79	17	20 66
8	4 46	6 6	7 92	10 1	12 36	14 96	17	20 89
(18)	4 51	6 12	8 1	10 13	12 50	15 12	18 0	21 13
2	4 56	6 19	8 10	10 24	12 64	15 29	18	21 36
4	4 61	6 26	8 19	10 35	12 78	15 46	18	21 60
6	4 65	6 33	8 28	10 46	12 92	15 63	18	21 83
8	4 71	6 40	8 37	10 58	13 6	15 80	18	22 7
(19)	4 75	6 47	8 45	10 69	13 20	15 97	19 0	22 30
2	4 81	6 54	8 54	10 80	13 34	16 13	19	22 54
4	4 85	6 60	8 63	10 92	13 48	16 30	19	22 77
6	4 91	6 67	8 72	11 3	13 62	16 47	19	23 1
8	4 95	6 74	8 81	11 14	13 75	16 64	19	23 24
(20)	5 [illegible]	[illegible]	8 90	11 25	13 89	16 81	20	[illegible]
2	5 [illegible]	[illegible]	8 99	11 37	14 3	16 98	20	23 71
4	5 10	6 95	9 8	11 48	14 17	17 14	20	23 95
6	5 15	7 10	9 17	11 59	14 31	17 31	20	[illegible]
8	5 20	7 89	9 26	11 71	14 45	17 48	20	[illegible]
(21)	5 25	7 15	9 35	11 82	14 59	17 65	21	[illegible]
2	5 30	7 22	9 44	11 93	14 73	17 82	21	[illegible]
4	5 35	7 29	9 53	12 4	14 87	17 99	21	[illegible]
6	5 40	7 36	9 62	12 15	15 [illegible]	[illegible]	21	[illegible]
8	5 45	7 42	9 70	12 27	15 14	18 33	21	[illegible]

The true Square in Inches.

F. & P.	6	7	8	9	10	11	12	13
(22)	5 59	7 49	9 7	8 12	38 15	28 18	49 22	0 25
2	5 55	7 56	9 8	7 12	49 15	42 18	60 23	20 26
4	5 60	7 63	9 9	6 12	61 15	56 18	83 23	40 26
6	5 65	7 70	10 4	12	72 15	70 19	0 82	60 26
8	5 70	7 76	10 13	12	83 15	84 19	16 22	80 26
(23)	5 75	7 83	10 22	12	94 15	98 19	33 23	0 26
2	5 80	7 90	10 31	13	6 16	12 19	50 23	20 27
4	5 85	7 97	10 40	13	17 16	25 19	67 23	40 27
6	5 90	8 4	10 49	13	28 16	39 19	84 23	60 27
8	5 95	8 10	10 58	13	39 16	53 20	0 24	80 27
(24)	6 0	8 17	10 67	13	51 16	67 20	17 24	0 28
2	6 5	8 24	10 76	13	62 16	81 20	34 24	20 28
4	6 10	8 31	10 85	13	73 16	95 20	51 24	40 28
6	6 15	8 38	10 94	13	84 17	9 20	68 24	60 28
8	6 20	8 45	11 2	13	95 17	23 20	85 24	80 29
(25)	6 25	8 51	11 11	14	7 17	36 21	2 25	0 29
2	6 30	8 58	11 20	14	18 17	50 21	19 25	20 29
4	6 35	8 65	11 29	14	29 17	64 21	36 25	40 29
6	6 40	8 72	11 38	14	40 17	78 21	53 25	60 29
8	6 45	8 79	11 47	14	51 17	92 21	70 25	80 30
(26)	6 50	8 85	11 56	14	62 18	6 21	87 26	0 30
2	6 55	8 92	11 65	14	73 18	20 21	4 26	20 30
4	6 60	8 99	11 74	14	84 18	34 22	21 26	40 30
6	6 65	9 6	11 83	14	95 18	48 22	38 26	60 30
8	6 70	9 13	11 92	15	6 18	62 22	55 26	80 31
(27)	6 75	9 19	12 1	15	17 18	76 22	72 27	0 31
2	6 80	9 26	12 10	15	28 18	90 22	89 27	20 31
4	6 85	9 33	12 19	15	39 19	4 23	6 27	40 32
6	6 90	9 40	12 28	15	50 19	17 23	23 27	60 32
8	6 95	9 47	12 37	15	61 19	31 23	40 27	80 32
(28)	7 0	9 53	12 46	15	72 19	45 23	57 28	0 33
2	7 5	9 60	12 55	15	83 19	59 23	74 28	20 33
4	7 10	9 67	12 64	15	94 19	73 23	91 28	40 33
6	7 15	9 74	12 73	15	5 20	87 24	8 28	60 33
8	7 20	9 80	12 82	16	16 20	0 24	25 28	80 34

The true Square in Inches.

Leng. in F. & P.	14	15	16	17	18	19	20	21
(1)	1 36	1 56	1 78	2 0	2 25	2 51	2 78	3 [illegible]
2	1 63	1 82	2 15	2 41	2 70	3 0	3 34	3 68
4	1 91	2 21	2 49	2 82	3 15	3 49	3 90	4 29
6	2 18	2 54	2 84	3 23	3 60	3 99	4 46	4 90
8	2 46	2 87	3 20	3 62	4 5	4 49	5 [illegible]	5 51
(2)	2 73	3 19	3 55	4 3	4 50	4 99	5 57	6 13
2	3 0	3 52	3 91	4 43	4 95	5 49	6 12	6 74
4	3 28	3 85	4 26	4 83	5 40	5 99	6 68	7 35
6	3 55	4 18	4 62	5 25	5 85	6 49	7 23	7 97
8	3 82	4 50	4 98	5 64	6 30	7 0	7 79	8 58
(3)	4 9	4 83	5 33	6 [illegible]	6 75	7 50	8 35	9 19
2	4 36	5 16	5 69	6 44	7 20	8 0	8 60	9 81
4	4 65	4 86	4 46	6 88	7 65	8 50	9 46	10 42
6	4 91	5 81	6 40	7 [illegible]	8 10	9 0	10 1	11 4
8	5 18	6 14	6 75	7 64	8 55	9 50	10 57	11 65
(4)	5 45	6 46	7 11	8 [illegible]	9 0	10 0	11 12	12 26
2	5 73	6 79	7 46	8 45	9 45	10 51	11 68	12 88
4	6 0	7 12	7 82	8 [illegible]	9 90	11 01	12 23	13 49
6	6 27	7 44	8 17	9 2[illegible]	10 35	11 51	12 79	14 10
8	6 54	7 78	8 53	9 65	10 80	12 01	13 34	14 71
(5)	6 81	8 11	8 88	10 [illegible]	11 25	12 51	13 90	15 33
2	7 8	8 45	9 24	10 45	11 70	13 2	14 45	15 94
4	7 35	8 [illegible]	9 60	10 [illegible]	12 15	13 52	15 1	16 55
6	7 63	8 99	9 [illegible]	11 25	12 60	14 2	15 56	17 17
8	7 90	9 41	10 31	11 65	13 [illegible]	14 52	16 12	17 78
(6)	8 17	9 [illegible]	10 67	12 [illegible]	13 50	15 [illegible]	16 67	18 39
2	8 44	10 [illegible]	11 [illegible]	12 [illegible]	13 [illegible]	15 53	17 23	19 0
4	8 71	10 39	11 38	12 88	14 40	16 3	17 [illegible]	19 61
6	8 98	10 72	11 73	13 [illegible]	14 85	16 54	18 [illegible]	20 23
8	9 26	11 6	12 [illegible]	13 65	15 30	17 [illegible]	18 89	20 84
(7)	9 53	11 38	12 45	14 [illegible]	15 [illegible]	17 54	19 45	21 45
2	9 80	11 71	12 81	14 [illegible]	16 20	18 5	20 0	22 6
4	10 7	12 [illegible]	13 [illegible]	14 [illegible]	16 [illegible]	18 [illegible]	20 56	22 [illegible]
6	10 34	12 36	13 [illegible]	15 [illegible]	17 10	19 [illegible]	21 11	23 [illegible]
8	10 61	12 69	13 87	15 [illegible]	17 55	19 56	21 67	23 90

A Table of Solids.

The true Square in Inches.

	14	15	16	17	18	19	20	21
0	10 90	12 59	14 60	16 6	18 0	20 6	22 21	24 5
2	11 16	12 82	14 58	16 46	18 45	20 56	22 78	25 1
4	11 41	13 13	14 94	16 86	18 90	21 6	23 34	25 7
6	11 74	13 44	15 29	17 26	19 35	21 56	23 90	26 3
8	11 98	13 76	15 64	17 67	19 80	22 6	24 45	26 9
9)	12 25	14 7	15 99	18 7	20 25	22 57	25 1	27 5
2	12 52	14 38	16 35	18 47	20 70	23 7	25 57	28 1
4	12 79	14 69	16 70	18 87	21 15	23 57	26 13	28 7
6	13 6	15 1	17 5	19 27	21 60	24 7	26 68	29 3
8	13 33	15 32	17 41	19 67	22 5	24 57	27 24	29 9
10)	13 59	15 63	17 76	20 7	22 50	25 7	27 79	30 6
2	13 92	15 94	18 12	20 48	22 95	25 57	28 35	31 2
4	14 19	16 26	18 47	20 86	23 40	26 7	28 85	31 8
6	14 45	16 57	18 83	21 28	23 85	26 58	29 41	32 4
8	14 73	16 88	19 18	21 68	24 30	27 8	29 97	33 1
11)	15 99	17 19	19 56	22 8	24 75	27 58	30 52	33 7
2	15 26	17 51	19 89	22 48	25 20	28 8	31 8	34 3
4	15 52	17 82	20 25	22 88	25 65	28 58	31 64	34 9
6	15 79	18 13	20 60	23 28	26 10	29 8	32 20	35 5
8	16 6	18 44	20 96	23 68	26 55	29 58	32 75	36 1
12)	16 33	18 75	21 32	24 8	27 0	30 8	33 31	36 8
2	16 60	19 7	21 67	24 49	27 45	30 59	33 87	37 4
4	16 87	19 38	22 3	24 89	27 90	31 9	34 43	38 1
6	17 14	19 69	22 38	25 29	28 35	31 59	34 98	38 6
8	17 40	20 0	22 74	25 69	28 80	32 9	35 54	39 2
13)	17 67	20 32	23 10	26 9	29 25	32 59	36 10	39 8
2	17 94	20 63	23 45	26 49	29 70	33 9	36 65	40 4
4	18 21	20 94	23 81	26 89	30 15	33 59	37 21	41 1
6	18 48	21 25	24 17	27 29	30 60	34 9	37 77	41 6
8	18 75	21 57	24 52	27 69	31 5	34 59	38 33	42 3
14)	19 2	21 88	24 88	28 9	31 50	35 9	38 88	42 9
2	19 29	22 19	25 24	28 49	31 95	35 60	39 44	43 5
4	19 56	22 50	25 59	29	32 40	36 10	40	44 1
6	19 89	22 81	25 95	29 30	32 85	36 60	40 55	44 7
8	20 15	23 13	26 31	29 70	33 30	37 10	41 11	45 4

The true Square in Inches.

	14	15	16	17	18	19	20	21
(1)	20 42	23 44	26 67	30 10	33 76	37 61	41 97	45 [illegible]
2	20 70	23 76	27 2	30 93	34 21	38 11	42 2	46 [illegible]
4	20 97	24 7	27 37	30 92	34 66	38 61	42 58	47 16
6	21 24	24 38	27 74	31 13	35 11	39 1	43 14	47 [illegible]
8	21 51	24 69	28 9	31 78	35 55	39 61	43 89	48 [illegible]
(6)	21 79	25 0	28 45	32 12	36 0	40 12	44 45	49 [illegible]
2	22 6	25 32	28 80	32 52	36 45	40 61	45 1	49 [illegible]
4	22 33	25 63	29 16	32 92	36 90	41 11	45 57	50 [illegible]
6	22 60	25 94	29 51	33 32	37 35	41 61	46 12	50 [illegible]
8	22 87	26 25	29 87	33 73	37 80	42 12	46 68	51 [illegible]
(7)	23 15	26 56	30 23	34 13	38 25	42 61	47 24	52 [illegible]
2	23 42	26 88	30 58	34 53	38 70	43 11	47 79	52 [illegible]
4	23 69	27 19	30 94	34 93	39 15	43 61	48 35	53 [illegible]
6	23 96	27 50	31 29	35 33	39 60	44 11	48 91	53 [illegible]
8	24 24	27 82	31 65	35 73	40 5	44 62	49 46	54 [illegible]
(8)	24 51	28 13	32 [illegible]	36 [illegible]	40 51	45 12	50 2	55 [illegible]
2	24 78	28 [illegible]	32 [illegible]	36 [illegible]	40 95	45 62	50 57	55 [illegible]
4	25 [illegible]	28 [illegible]	32 [illegible]	36 94	41 40	46 12	51 13	56 [illegible]
6	25 [illegible]	29 [illegible]	33 [illegible]	37 34	41 85	46 63	51 69	56 [illegible]
8	25 [illegible]	29 [illegible]	33 39	37 74	42 30	47 13	52 24	57 [illegible]
(9)	25 [illegible]	29 [illegible]	33 70	38 14	42 75	47 63	52 80	58 [illegible]
2	26 [illegible]	30 [illegible]	34 [illegible]	38 54	43 20	48 13	53 35	58 [illegible]
4	26 [illegible]	30 [illegible]	34 [illegible]	38 94	43 65	48 64	53 91	59 [illegible]
6	26 [illegible]	30 [illegible]	35 [illegible]	39 35	44 10	49 14	54 46	60 [illegible]
8	26 [illegible]	31 [illegible]	35 [illegible]	39 75	44 55	49 65	55 1	60 [illegible]
(10)	27 23	31 [illegible]	35 [illegible]	40 15	45 [illegible]	50 16	55 57	61 [illegible]
2	27 50	31 [illegible]	35 [illegible]	40 55	45 45	50 65	56 12	62 [illegible]
4	27 77	31 [illegible]	36 [illegible]	40 95	45 90	51 15	56 67	62 [illegible]
6	28 4	32 [illegible]	36 [illegible]	41 [illegible]	46 [illegible]	51 65	57 [illegible]	63 [illegible]
8	28 32	32 [illegible]	36 [illegible]	41 [illegible]	46 [illegible]	52 15	57 [illegible]	63 [illegible]
(11)	28 59	32 [illegible]	37 [illegible]	42 [illegible]	47 [illegible]	52 66	58 [illegible]	64 [illegible]
2	28 86	33 [illegible]	37 [illegible]	42 [illegible]	47 [illegible]	53 16	58 [illegible]	64 [illegible]
4	29 13	33 [illegible]	38 [illegible]	43 [illegible]	48 [illegible]	53 66	59 [illegible]	65 [illegible]
6	29 41	33 76	38 [illegible]	43 [illegible]	48 60	54 16	60 [illegible]	66 [illegible]
8	29 68	34 [illegible]	38 [illegible]	43 76	49 5	54 66	60 [illegible]	66 [illegible]

The true Contents in Inches.

	14	15	16	17	18	19	20	21
0	22	95	24	38	39	11	41	16
2	30	21	34	70	39	47	44	58
4	30	48	35	2	39	83	44	99
6	30	75	35	33	40	19	45	40
8	31	2	35	65	40	54	45	81
10	31	29	35	97	40	90	46	16
2	31	56	36	28	41	26	46	52
4	31	84	36	60	41	62	46	88
6	32	11	36	92	41	98	47	24
8	32	38	37	24	42	34	47	60
20	32	65	37	55	42	67	48	24
2	32	92	37	87	43	3	48	59
4	33	20	38	19	43	39	48	95
6	33	47	38	50	43	75	49	31
8	33	75	38	82	44	10	49	67
30	34	2	39	14	44	46	50	3
2	34	29	39	37	44	82	50	38
4	34	57	39	69	45	17	50	74
6	34	84	40	1	45	53	51	10
8	35	11	40	33	45	88	51	46
40	35	38	40	64	46	24	52	18
2	35	66	40	96	46	59	52	53
4	35	93	41	28	46	95	52	89
6	36	20	41	59	47	30	53	24
8	36	47	41	91	47	66	53	60
50	36	75	42	23	48	0	54	19
2	37	2	42	54	48	37	54	82
4	37	29	42	86	48	72	55	18
6	37	56	43	18	49	8	55	53
8	37	84	43	49	49	43	55	89
60	38	11	43	81	49	79	56	24
2	38	38	44	13	50	14	56	60
4	38	66	44	45	50	50	56	95
6	38	93	44	77	50	85	57	31
8	39	20	45	9	51	21	57	67

	22	23	24	25	26	27	28	29
0	11	73	18	80	26	89	36	99
2	12	39	19	46	27	55	37	65
4	13	5	20	12	28	21	38	31
6	13	71	20	78	28	87	38	97
8	14	37	21	44	29	53	39	63
10	15	3	22	10	30	19	40	29
2	15	69	22	76	30	85	40	95
4	16	35	23	42	31	51	41	61
6	17	1	24	8	32	17	42	27
8	17	67	24	74	32	83	42	93
20	18	33	25	40	33	49	43	59
2	18	99	26	6	34	15	44	25
4	19	65	26	72	34	81	44	91
6	20	31	27	38	35	47	45	57
8	20	97	28	4	36	13	46	23
30	21	63	28	70	36	79	46	89
2	22	29	29	36	37	45	47	55
4	22	95	30	2	38	11	48	21
6	23	61	30	68	38	77	48	87
8	24	27	31	34	39	43	49	53
40	24	93	32	0	40	9	50	19
2	25	59	32	66	40	75	50	85
4	26	25	33	32	41	41	51	51
6	26	91	33	98	42	7	52	17
8	27	57	34	64	42	73	52	83
50	28	23	35	30	43	39	53	49
2	28	89	35	96	44	5	54	15
4	29	55	36	62	44	71	54	81
6	30	21	37	28	45	37	55	47
8	30	87	37	94	46	3	56	13
60	31	53	38	60	46	69	56	79
2	32	19	39	26	47	35	57	45
4	32	85	39	92	48	1	58	11
6	33	51	40	58	48	67	58	77
8	34	17	41	24	49	33	59	43

	The Inches Square Inches							
F.	22	23	24	25	26	27	28	29
(1)	3 36	3 68	4 [illegible]	[illegible]	4 70	5 1	5 45	5 [illegible]
2	4 44	4 34	80	4 [illegible]	5 04	5 [illegible]	5 [illegible]	[illegible]
4	4 71	5 16	5 60	6 [illegible]	5 76	5 77	5 97	6 38
6	5 38	5 90	6 40	6 [illegible]	6 94	7 50	7 [illegible]	7 [illegible]
8	6 5	6 63	7 20	7 [illegible]	8 18	8 44	8 [illegible]	8 [illegible]
(2)	6 72	7 37	8 [illegible]	8 [illegible]	9 38	10 13	10 89	11 [illegible]
2	7 40	8 10	8 80	9 [illegible]	10 32	11 [illegible]	12 [illegible]	12 [illegible]
4	8 7	8 49	9 60	10 [illegible]	11 [illegible]	12 [illegible]	13 [illegible]	14 [illegible]
6	8 74	9 57	10 40	11 [illegible]	12 [illegible]	13 [illegible]	14 [illegible]	15 [illegible]
8	9 41	10 31	11 [illegible]	12 [illegible]	13 [illegible]	14 [illegible]	15 [illegible]	16 [illegible]
(3)	10 8	11 [illegible]	12 [illegible]	13 [illegible]	14 [illegible]	15 [illegible]	16 34	17 [illegible]
2	10 76	11 78	12 80	13 [illegible]	15 [illegible]	16 21	17 43	18 [illegible]
4	11 43	12 49	13 60	14 [illegible]	15 [illegible]	17 22	18 52	19 [illegible]
6	12 10	13 22	14 40	15 62	16 90	18 23	19 60	21 [illegible]
8	12 77	13 96	15 20	16 [illegible]	17 84	19 24	20 69	22 [illegible]
(4)	13 44	14 70	16 0	17 36	18 78	20 26	21 78	23 [illegible]
2	14 12	15 43	16 80	18 [illegible]	19 72	21 27	22 87	24 [illegible]
4	14 79	16 16	17 60	19 10	20 66	22 28	23 96	25 [illegible]
6	15 46	16 90	18 40	19 97	21 60	23 29	25 [illegible]	[illegible]
8	16 13	17 64	19 20	20 83	22 54	24 30	26 14	28 [illegible]
(5)	16 80	18 37	20 0	21 70	23 48	25 [illegible]	27 23	29 [illegible]
2	17 48	19 11	20 80	22 57	24 42	26 33	28 [illegible]	30 [illegible]
4	18 15	19 84	21 60	23 44	25 36	27 34	29 40	31 [illegible]
6	18 82	20 58	22 40	24 [illegible]	26 30	28 35	30 49	32 [illegible]
8	19 49	21 31	23 20	25 [illegible]	27 24	29 37	31 58	33 [illegible]
(6)	20 16	22 [illegible]	24 0	26 [illegible]	28 17	30 38	32 67	35 [illegible]
2	20 84	22 78	24 80	26 [illegible]	29 11	31 39	33 76	36 [illegible]
4	21 51	23 52	25 60	27 [illegible]	30 [illegible]	32 40	34 85	37 [illegible]
6	22 18	24 25	26 40	28 [illegible]	31 [illegible]	33 42	35 94	38 [illegible]
8	22 85	25 [illegible]	27 20	29 [illegible]	32 94	34 43	37 [illegible]	39 [illegible]
(7)	23 52	26 73	28 [illegible]	30 [illegible]	33 88	35 44	38 12	40 [illegible]
2	24 20	26 46	28 80	31 [illegible]	34 83	36 45	39 20	42 [illegible]
4	24 87	27 19	29 60	32 [illegible]	34 74	37 47	40 29	43 [illegible]
6	25 54	27 93	30 40	33 [illegible]	35 69	38 48	41 38	44 [illegible]
8	26 21	28 66	31 20	33 [illegible]	36 62	39 49	42 47	45 [illegible]

Eng. in F. & P.	The true Square in Inches.							
	22	23	24	25	26	27	28	29
(1)	26 90	29 19	32 0	34 73	37 56	40 50	43 56	46 73
2	27 56	30 13	32 80	35 59	38 49	41 52	44 67	47 94
4	28 23	30 87	33 60	36 46	39 42	42 54	45 78	49 6
6	28 89	31 60	34 40	37 33	40 36	43 55	46 89	50 23
8	29 56	32 33	35 20	38 19	41 30	44 56	47 91	51 40
(9)	30 23	33 7	36 0	39 6	42 24	45 57	49 0	52 57
2	30 89	33 80	36 80	39 93	43 18	46 59	50 2	53 75
4	31 56	34 54	37 60	40 80	44 12	47 60	51 14	54 92
6	32 23	35 27	38 40	41 68	45 6	48 61	52 27	56 10
8	32 89	36 0	39 20	42 5	46 0	49 62	53 39	57 28
(10)	33 56	36 74	40 0	43 40	46 94	50 64	54 45	58 46
2	34 23	37 47	40 80	44 27	47 87	51 65	55 54	59 64
4	34 89	38 21	41 60	45 14	48 81	52 66	56 66	60 80
6	35 56	38 94	42 40	46 1	49 75	53 67	57 77	61 91
8	36 23	39 68	43 20	46 87	50 69	54 69	58 88	63 8
(11)	36 89	40 41	44 0	47 74	51 63	55 70	59 99	64 26
2	37 56	41 14	44 80	48 61	52 57	56 71	60 91	65 43
4	38 23	41 88	45 60	49 48	53 51	57 72	62 7	66 58
6	38 89	42 61	46 40	50 35	54 45	58 73	63 18	67 75
8	39 56	43 34	47 20	51 23	55 39	59 74	64 29	68 92
(12)	40 23	44 8	48 0	52 8	56 33	60 76	65 34	70 9
2	40 89	44 81	48 80	52 95	57 27	61 77	66 42	71 21
4	41 56	45 35	49 60	53 82	58 21	62 78	67 51	72 42
6	42 23	46 28	50 40	54 69	59 15	63 79	68 60	73 59
8	42 89	47 2	51 20	55 56	60 10	64 80	69 69	74 76
(13)	43 56	47 75	52 0	56 43	61 4	65 81	70 78	75 93
2	44 23	48 49	52 80	57 30	61 98	66 82	71 87	77 10
4	44 89	49 22	53 60	58 18	62 92	67 83	72 96	78 28
6	45 56	49 95	54 40	59 5	63 86	68 84	74 5	79 45
8	46 23	50 69	55 20	59 92	64 80	69 85	75 14	80 62
(14)	46 89	51 42	56 0	60 79	65 74	70 86	76 23	81 79
2	47 56	52 16	56 80	61 66	66 68	71 87	77 32	82 96
4	48 23	52 90	57 60	62 53	67 62	72 88	78 40	84 13
6	48 89	53 63	58 40	63 39	68 56	73 89	79 49	85 30
8	49 56	54 37	59 20	64 26	69 50	74 90	80 58	86 47

A Table of Solids.

The true Square in Inches.

Leng. in F. & P.	22	23	24	25	26	27	28	29	
(15)	50 42	55 10	60 0	65 11	70	42 75	95 81	65 87	61
2	51 9	55 84	60 80	65 98	71	35 76	96 82	76 88	77
4	51 77	56 58	61 60	66 84	72	29 78	98 83	87 89	94
6	52 44	57 31	62 40	67 71	73	23 79	99 84	98 91	10
8	53 11	58 4	63 20	68 58	74	19 80	0 86	3 92	27
(16)	53 77	58 77	64 0	69 45	75	10 81	1 87	12 93	44
2	54 46	59 50	64 80	70 32	76	4 82	2 88	21 94	61
4	55 13	60 23	65 60	71 18	76	98 83	4 89	30 96	78
6	55 80	60 96	66 40	72 5	77	93 84	5 90	39 96	94
8	56 47	61 70	67 20	72 92	78	86 85	6 91	47 98	11
(17)	57 14	62 52	68 0	73 79	79	80 86	7 92	56 99	28
2	57 81	63 25	68 80	74 66	80	74 87	8 93	65 100	45
4	58 49	63 98	69 60	75 53	81	68 88	10 94	74 101	62
6	59 16	64 71	70 40	76 39	82	62 89	11 95	83 102	79
8	59 83	65 44	71 20	77 26	83	56 90	12 96	92 103	95
(18)	60 50	66 17	72 0	78 12	84	50 91	13 98	0 105	12
2	61 18	66 90	72 80	79 0	85	44 92	14 99	9 106	29
4	61 85	67 66	73 60	79 87	86	38 93	16 100	18 107	46
6	62 52	68 39	74 40	80 74	87	31 94	17 101	27 108	63
8	63 19	69 12	75 20	81 60	88	25 95	18 102	36 109	80
(19)	63 86	69 85	76 0	82 47	89	20 96	19 103	44 110	96
2	64 54	70 58	76 80	83 34	90	13 97	20 104	54 112	13
4	65 81	71 31	77 60	84 21	91	7 98	22 105	63 113	30
6	65 88	72 4	78 40	85 8	92	1 99	23 106	72 114	47
8	66 45	72 78	79 20	85 95	93	91 100	24 107	81 115	64
(20)	67 22	73 50	80 0	86 81	93	89 101	25 108	90 116	80
2	67 89	74 23	80 80	87 68	94	83 102	26 109	99 117	97
4	68 57	74 96	81 60	88 55	95	77 103	28 111	9 119	14
6	69 24	75 69	82 40	89 42	96	71 104	29 112	17 120	31
8	69 91	76 42	83 20	90 29	97	65 105	30 113	26 121	48
(21)	70 58	77 15	84 0	91 16	98	59 106	31 114	35 122	65
2	71 26	77 88	84 80	92 2	99	53 107	32 115	43 123	82
4	71 93	78 61	85 60	92 89	100	47 108	34 116	52 124	98
6	72 60	79 34	86 40	93 76	101	40 109	35 117	61 126	15
8	73 27	80 7	87 20	94 63	102	34 110	36 118	70 127	32

A Table of Solids.

The true Square in Inches.

Legs in F. & P.	22	23	24	25	26	27	28	29
(22)	73 95	80 8	88 9	95 10	103 11	111 12	119 13	127 14
2	74 62	81 55	88 48	96 37	104 32	112 28	120 23	128 18
4	75 30	82 28	89 60	97 23	105 15	113 8	121 97	130 87
6	75 97	83 2	90 40	98 10	106 9	114 81	123 6	131 83
8	76 64	83 75	91 20	98 97	107 3	115 82	124 14	133 1
(23)	77 1	84 49	92 0	99 84	107 97	116 94	125 23	133 14
2	77 98	85 22	92 80	100 70	108 91	117 48	126 38	134 28
4	78 66	85 96	93 60	101 57	109 85	118 97	127 41	135 86
6	79 33	86 69	94 40	102 44	110 79	119 48	128 10	137
8	80 0	87 43	95 20	103 31	111 73	120 49	129 59	138
(24)	80 67	88 16	96 0	104 17	112 67	121 50	130 68	140
2	81 34	88 90	96 80	105 4	113 61	122 51	131 76	141
4	82 2	89 63	97 60	105 91	114 54	123 53	132 85	142
6	82 69	90 36	98 40	106 78	115 48	124 54	133 94	143
8	83 36	91 10	99 20	107 64	116 42	125 55	135 3	144
(25)	84 3	91 83	100 0	108 51	117 36	126 56	136 12	146
2	84 70	92 57	100 80	109 48	118 30	127 57	137 21	147
4	85 38	93 31	101 60	110 25	119 24	128 59	138 30	148
6	86 5	94 4	102 40	111 12	120 18	129 60	139 38	149
8	86 72	94 78	103 20	111 99	121 12	130 61	140 47	150
(26)	87 39	95 51	104 0	112 85	122 6	131 62	141 56	151
2	88 6	96 25	104 80	113 72	123 0	132 64	142 65	153
4	88 74	96 98	105 60	114 59	123 93	133 65	143 74	154
6	89 41	97 72	106 40	115 46	124 88	134 67	144 81	155
8	90 8	98 45	107 20	116 32	125 81	135 68	145 90	156
(27)	90 75	99 19	108 0	117 19	126 75	136 69	146 99	157
2	91 42	99 92	108 80	118 6	127 69	137 70	148 8	159
4	92 9	100 66	109 60	118 93	128 63	138 71	149 18	160
6	92 77	101 39	110 40	119 79	129 57	139 72	150 27	161
8	93 44	102 13	111 20	120 66	130 51	140 74	151 36	162
(28)	94 11	102 86	112 0	121 53	131 45	141 75	152 45	163
2	94 79	103 60	112 80	122 40	132 39	142 76	153 54	164
4	95 46	104 33	113 60	123 27	133 33	143 77	154 63	165
6	96 13	105 07	114 40	124 13	134 26	144 78	155 72	167
8	96 80	105 80	115 20	125 0	135 20	145 80	156 81	168

Leng. in Feet.	The true Square in Inches.						
	30	31	32	33	34	35	36
1	6 23	6 68	7 11	7 57	8 3	8 51	9
2	12 50	13 5	14 22	15 13	16 6	17 2	18
3	18 75	20 2	21 34	22 69	24 9	25 52	27
4	25 0	26 70	28 46	30 25	32 12	34 3	36
5	31 25	33 37	35 58	37 81	40 14	42 54	45
6	37 50	40 5	42 70	45 38	48 16	51 4	54
7	43 75	46 74	49 81	52 94	56 18	59 55	63
8	50 0	53 39	56 92	60 50	64 20	68 5	72
9	56 25	60 7	64 3	68 6	72 23	76 56	81
10	62 50	66 74	71 14	75 68	80 26	85 7	90
11	68 75	73 41	78 25	83 19	88 29	93 57	99
12	75 0	80 9	85 36	90 73	96 31	102 8	108
13	81 25	86 76	92 47	98 31	104 34	110 59	117
14	87 50	93 43	99 58	105 87	112 37	119 9	126
15	93 75	100 11	106 69	113 43	120 40	127 60	135
16	100 0	106 78	113 80	121 0	128 44	136 11	144
17	106 25	113 45	120 91	128 56	136 47	144 61	153
18	112 50	120 1	128 2	136 12	144 50	153 12	162
19	118 75	126 80	135 16	143 68	152 53	161 63	171
20	125 0	133 47	142 24	151 25	160 56	170 13	180
21	131 25	140 15	149 35	158 81	168 58	178 64	189
22	137 50	146 82	156 46	166 37	176 61	187 15	198
23	143 75	153 50	163 57	173 93	184 64	195 65	207
24	150 0	160 18	170 68	181 50	192 67	204 16	216
25	156 25	166 75	177 79	189 6	200 70	212 67	225
26	162 50	173 52	185 90	196 62	208 73	221 17	234
27	168 75	180 20	192 0	204 18	216 75	229 68	243
28	175 0	186 76	199 11	211 74	224 78	238 19	252
29	181 25	193 53	206 22	219 31	232 80	246 70	261
30	187 50	200 21	213 34	226 87	240 83	255 21	270
31	193 75	206 88	220 45	234 43	248 86	263 71	279
32	200 0	213 56	227 56	241 99	256 89	272 22	288
33	206 25	220 23	234 67	249 56	264 92	280 73	297
34	212 50	226 90	241 78	257 12	272 95	289 23	306
35	218 75	233 57	248 89	264 68	280 97	297 74	315
36	225 0	240 25	256 0	272 25	289 0	306 25	324

The Use of the preceding Tables in Surveying.

The Use of the Table of Square Roots.

The Table of Square Roots shew the Roots of all numbers, from 1 to 140, with the square numbers answering, which is of excellent use in finding the square equal of Circles, and also in finding the true square of unequal sides of a Timber, an Example in each kind follows.

I. *Examp.* Admit a Circle whose Circumference is 188.6, and the Diameter 60. the Area of the Circle 2771. 16. as in the Table for that purpose, the Root of which Area or the neareſt to it being found in the Table of Square Roots, and the Root answering is 47.8 the side of the square equal to that Circle.

II. *Examp.* Suppose a Timber-Log or other Solid be in thickneſs 20.2 inches, and in breadth 22.6 which two sums being multiplied, gives in the Product 452.48, which find in the Table of square Roots, or the neareſt to it, against which stands 21.3, being the true square of the unequal sides Solid.

The Use of the Table of Solids.

This *Table* serves to find the solidity of Round and Square Solids, Cones and their Fruſtums, and also of Globes; but for those Solids that have length, and conſiſt of four equal sides, 'tis but entering with the side of the Square in inches on the top of the *Table*, and with the length in Feet and Parts on the left hand, and in the meeting Angle is the Content in solid Feet and Parts.

Example, Of a Timber-Log conſiſting of four equal sides, each side containing 25 Inches, and the length 20.2 Foot, with which enter the Table as the *Title* directs, and in the Angle of meeting is 87.68, that

that is 87 solid Feet, and 100 parts of a Foot.

By these Tables to find the Solidity of unequal sided Timb.

Suppose an unequal sided Solid to be measured, whose thickness is 20.2 Inches, and the breath 22.4, being multiplied together, the Product is 452.48, whose Square Root (by the *Table* for that purpose) is 21.3, now supposing the length to be 18.6 Feet, with which entering the *Table* of Solids by the directions following, gives the solid Content 58.81 Feet, as in the Example following; where Note, that because the true Square is not to be found in the *Table*, it being only to inches, and here being 3 tenths above 21 Inches, for which reason proceed thus, viz. enter the *Table* on the downright Column on the left hand, with the length 18.6 Feet, under 21 in the top and in the Angle of meeting is 56.96 Feet, then with the same length enter the *Table* under 22 in the top in which meeting Angle is 62.52 Feet, the difference of these two sums is 5.56, three tenths of which is 1.85, which added to 56.96, gives 58.81 the Content in solid Feet.

Example.

18.6 the length under 21 is	56.96
18.6 the length under 22 is	62.52
Difference	5.56
3 tenths, of which difference is	1.85
Content in Solid Feet	58. 81

The common way is to add the broader and narrower sides together, and take the half for the true Square, but this way is false, and the more the difference is in the sides, the greater the error, but because some are wedded to this way, in respect they neither

neither do know nor will not give themſelves to learn better; I ſhall therefore add one Example. Suppoſe a ſquared piece of Timber to be 16 inches broad and 14 inches deep, which added makes 30, whoſe half is 15 accounted for the true ſquare, then ſuppoſing the length 25 Foot, with which two ſums enter the Table of Solids as the Title directs, and in the Angle of meeting is 39.06 Feet Solid.

The Uſe of the Tables in Meaſuring Cylinders, *as Round Timber Collumbs*, &c.

A *Cylinder* is a round Solid, having length, as round Timber, the Baſis being at both ends equal, whoſe Content may be found by having the Diameter or Circumference given, which find in the Table of Diameters and Circumferences, againſt which ſtands the Aare of the Circle agreeing to that Diameter and Circumference, with which Aare enter the Table of Squares, and the Root anſwering is the true Square or Square equal, which entered in the Table of Solids on the top, and with the length in Feet and Parts on the left hand, and in the Angle of meeting is the Solid Content in Feet and Parts.

Examp. Of a Timber-Log whoſe length is 12.2 Feet, the Diameter 30 Inches, whoſe Circumference is 94.2 Inches, the Aare of the Circle anſwering 706.5 as by the *Table* for that purpoſe, the Square Root of which Aare as by the Table is 26.5 that is 26 Inches and 5 tenths, or half an Inch, by which and the length the Content (in the *Table* of Solids) may be found as followeth.

Length 12.2 under 26 is 57.27
Length 12.2 under 27 is 61.77

Difference 4.50

Half added to the leſſer number 2.25

Solid Content in Feet ——— 59 52

To Meaſure Round Tapering Timber called the Fruſtum of a Cone by Tables.

Take the Circumference juſt in the middle for a mean, and then proceed as in a *Cylinder* and tho' this way be not exact, it will come very near if it be taken at ſeveral lengths, *viz.* to every 5 or 9 Foot.

To find the Solid Content of a Cone by Tables.

Suppoſe a Cone whoſe length is 945 Inches $\frac{1}{3}$ of which is 515 Inches or 26.2 Feet Diameter of the Baſe is 19.2 Aares of which Baſe is 289.44 by that Table, which gives in the Table of Square Roots 17 Inches for the Square equal of the Cones Baſe, which find in the top of the Table of Solids and 26.2 being $\frac{1}{3}$ of the length on the left hand, and in the Angle of meeting is 52.58 the Feet Solid in that Cone.

The *Fruſtums* of *Cones* may be found by theſe Tables alſo, for the Content of the whole *Cone* being found, find the leſſer *Cones* Content by the former Rules, which is the part cut off, which ſubſtracted out of the whole, leaveth the Solid Content of the *Fruſtum*, or Tapering piece of Timber, which indeed is the exacteſt way.

To find the Solid Content of a Globe *by Tables.*

Take the Circumference of the Globe or Sphere which gives in the Table of Diameter and Circumference, the Aare of the Circle correſponding, with which enter the Table of Square Roots, which Root gives the ſide of a Square equal to the Globes Solidity, with which ſide of the Square in Inches enter the Head of the Table in Solids, and alſo with the ſame length (converted into Feet and Parts) on the left hand, and in the Angle of meeting is the Solid Content in feet and parts.

Horologiography.

CHAP. I. FIG. I.

The Description and Use of an Instrument to take the Declination of Plains.

AMongst the Varieties of ways invented for taking the Declination of a Plain, none more exact and expeditious than a Quadrant and Horozontal Dial placed on an Index, and no Quadrant better than that of Mr. *Gunters*, if made to the Latitude of the place where you use it, and the larger the Quadrant, the better the Index, having the Horozontal Dial on it, is to be of that length, that a Pin put into the Center of the Index, and through the Center of the Quadrant, so that the other point may just touch the degree in the Limb of the Quadrant. See *Fig.* I.

To take the Declination of any Plain in a clear Sun-shine day, repair to the Wall where your Dial is to be made, and there take the hour of the day exactly by the Quadrant; which done, apply one side of the Quadrant to the Plain, so that the Limb may be towards the Sun, holding it Horozontally, having the Index placed upon it, which turn to the same hour of the day as was found by the Quadrant, and the other Point of the Index pointeth out the Degrees of Declination in the Limb of the Quadrant, without further trouble.

CHAP. II. FIG. II.

The Calculation and Projection of a Horozontal Dial.

A Horozontal Plain is always Parallel to the Horozontal Circle of the Sphere, whose Poles are in the Center and Nadier of that place where the Dial is made, but before we proceed to Calculate the hour Arches, draw the Meridian line A B C, and at A the Center, cross it at right Angles with the line F H which is the Six a Clock line both for Morning and Evening, then to Calculate the several hour Arches say, As Radius to the sine of the Poles Elevation, so the Tangent of the hour-lines at the Pole, to the Tangent of the hours distance from the Meridian, as we shall here instance in Calculating two hour-lines from the Meridian in the *Latitude* of 52° 40′.

I. For the hours of 11 and 1.

As the Radius 90 Degrees ——	10.000000
to the S. of 52° 40′. Poles Elev.	9.900433
So the Tang. 15 gr. Angle at Pole	9.428053
to Tang. of the ho. from Merid. 12° 1	9.328486

II. For the hours of 10 and 2

As the Radius 90 Degrees ———	10.000000
to S. of 52° 40′. Poles Elevation	9.900433
So Tang. 30 gr. Angle at the Pole	9.761439
To Tang. 2*d*. ho. a Merid. 24° 39′.	9.661872

Thus by adding 15 Degrees for each hour, using the former Analogy, the rest of the hour distance will be found; which may be transfer'd to the Plain by a Scale of Chords after this manner. Take in your Compasses 60 Degrees from the Scale of Chords and with one Foot in the Center A, describe the Arch F R H, then from the Scale of Cords take the several hour distances, setting them off from

th

the Meridian where the Chord-line interſects it, as at R, then from the Center through thoſe points prickt out in the Chord-line, draw lines which are the hour-lines required, then raiſe the Gnomon directly over the Meridian-line, whoſe heighth is to be 52° 40'. equal to the Latitude of the place, and the work is finiſhed.

Theſe Rules for projecting the hour-lines, being well underſtood, which in all Dials muſt be ſet off from the Subſtile, will ſave me the labour in teaching the Projection of what follows.

CHAP. III. FIG. III.

The Calculation and Projection of a South or North Dial.

THis Dial differeth from the former in nothing but the Poles Elevation, for in the Calculation of the Horozontal, we made uſe of 52° 40'. the Poles Elevation, and in this we muſt uſe 37° 20'. its Complement to 90° the ſame Rules holds as we ſhall here demonſtrate, as we ſhall inſtance in Calculating the two hour-lines 1 and 2, or 10 and 11, to find which, ſay, As the Radius to the C S of the Poles Elevation, ſo the Tang. of the hour-lines at the Pole, to the Tang. of the hours diſtance from the Meridian.

The Calculation, and 1ſt. for 1 and 11.

As the Radius 90 Degrees ———	10.000000
to C S of the Elevation 52° 40'.	9.782796
So Tang. of 15° Angle at the Pole	9.428052
to Tang. of the hour-Arch 90° 14'	9.210848

Secondly for 10 and 2.

As the Radius 90 Degrees ———	10.000000
to C S of the Elevation 52° 40'.	9.782796
So Tang. of 30 gr. Ang. at the Pole	9.761439
to Tang. of hour Arch 19° 18'	9.544235

And

And ſo on according to this order for the reſt of the hour Arches, which are to be projected into the Dial after the ſame manner as in the Horozontal Dial, only for the heighth of the Stile, the Complement of the Poles Elevation 37 gr. 20′. is the Stiles Elevation above the Plain,

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CHAP. IV. FIG. IV.

The Calculation and Projection of the Eaſt or Weſt Dial.

MAke choice firſt of a place in your Plain to draw a Horozontal line, as the line M N, then with a pair of Compaſſes take 60 Degrees from the Scale of Chords (and for an Eaſt Dial ſet one Foot in the point N, but for a Weſt Dial in the point M) and make the Arch A B, then take in your Compaſſes off on the Scale of Chords 52 Degrees 40′. the Latitude of the place, and ſet it from A to B, and draw the line N B, ſo ſhall the Angle N A B be equal to the Latitude of the place, then make choice of ſome convenient place in the line N B, as at K, to draw the Horozontal line of the Plain, as the line R K S, and upon the point K, draw a line perpendicular to the line K N as K O, which ſhall be the hour line for ſix a Clock in the Morning, then proportion the heighth of the Stile according to the largeneſs of the Plain, which may be done by inſpection the heighth in this Example we will take to be 7 Inches, then for the diſtance of the hour-lines from the ſix a Clock line, ſay, as the Radius to the Logarithm of the Stiles heighth, ſo the Tang. at the Angle at the Pole, to the Logarithm of the diſtance of each hour from the ſix a Clock line. The Calculation of the hour-lines follow.

First,

First, for hours of 5 and 7.

As the Radius 90 Degrees ——	10.00000
to the Log. of the Stiles heig. 7 In.	0.845.9
So the Tang. of 15 Degrees ——	9.4.8.5
to Log. of the diſtance of 1 ho. a 6 line which is 1. 88 that is 1 Inch $\frac{88}{100}$ Parts.	0.27314

Secondly, for hours of 4 and 8

As the Radius 90 Degrees ——	10.00000
to Log. of 7 Inches the Stiles heighth	0.84509
So Tang. of 30 Degrees ——	9.76143
to Log. diſtance of 2 hours from 6 which is 4.05 Inches.	0.60652

Thus by adding 15 Degrees to each hour, which worked up by the former Analogy, the diſtance of nine a Clock line from ſix a Clock line is 7 Inches, being alſo the heigth of the Stile, ſo likewiſe the ten a Clock line will be found 12.12 Inches from the ſix a Clock line, and the 11 a Clock line 26.13 Inches, the ſeveral hour diſtances being thus found, they may be inſerted into the Dial after this manner, draw a line Parallel to N K as A O, take then the ſeveral hour diſtances in Inches and Parts, and place them from K to oo &c. ſo likewiſe place the ſame diſtances upon the other line A O with the ſame diſtances the 6 a Clock line from O to oo &c. from which points draw the ſeveral hour lines, placing the proper Figures againſt the reſpective hour-lines, which will be all Parallel one to another, remembering to ſet of the hour-lines of 5 and 4 on the other ſide the Subſtile or ſix a Clock line equal to 7 and 8, then ſetting up the Gnomon which is 7 Inches high directly over the ſix a Clock line, and the work is finiſhed in this Eaſt Dial.

CHAP. V. FIG. V.

The Calculation and Projection of a South Declining Dial.

IN the firſt place, the Declination of the Plain, is to be found as in the firſt *Chapter*, which be very exact in, and then you may be the more certain in making an exact Dial by theſe following Analogies, where firſt note, if the Dial Plain decline Eaſtward, the Stile muſt ſtand on the Weſt ſide the Meridian; but if the Plain decline Weſtward, the Stile and Sub-ſtile muſt ſtand on the Eaſt of the Meridian, the Declination in this Example we will ſuppoſe 20 Degres from the South towards the Weſt. But before we can come to Calculate the ſeveral hour-diſtances from the Sub-ſtile, there is three requiſits to be found, *viz.* (1.) the heighth of the Stile above the Sub-ſtile (commonly called the Elevation of the Pole above the Plain. (2.) The diſtance of the Sub-ſtile from the Meridian. (3.) The Inclination of the Meridian of the Plain, to the Meridian of the Place.

I. As Radius 90 Degrees ———	10.00000
to C. S. of the Poles Elevat. 52° 40′.	9.78279
So C. S. of the Plains Dclinat. 20 gr.	9.97298
to S. of the Stiles heighth 34° 30′.	9.75577
II. As Radius 90 Degrees ———	10.00000
to S. of the Declination 20 gr.	9.53405
So C. T. Poles Elevat. 52. gr. 40 min.	9.88236
to T. Sub-ſtiles diſt. a Merid. 14° 37′.	9.41641
III. As Radius 90 Degrees ———	10.00000
to S. Poles Elevation 52 gr. 40 min.	9.90943
So C. T. of Plains Declinat, 20 gr.	10.43893
to C. T. to Inclin. of Merid. 24° 36′.	10.33936

Havin

Having here found the Stiles heighth 34 gr. 30′ and the diſtance of the Sub-ſtile from the Meridian 14 gr. 37′. Project them into the Dial Plane by a Scale of Chords from the Meridian, contrary to the coaſt of Declination; ſo will the Sub-ſtile fall between the hours of 1 and 2 of the Clock, then ſubſtract 15 Degrees (the Angle at the Pole for one hour) from 24 gr. 36′. the Inclination of Meridians, there remains 9 Degrees 36′. being the diſtance of 1 a Clock line from the Sub-ſtile, which is the Angle at the Pole, and ſerves to find the Arch of the Plane for that hour: then again, the diſtance of 2 a Clock from the Meridian, is 30 Degrees, from which ſubſtract 24 gr. 36′. the remainder is 5 gr. 24′. the diſtance of the 2 a Clock line from the Sub-ſtile, being the Angle at the Pole for that hour alſo; then to find the reſpective hour-Arches on the Dial, uſe this Anology.

As Radius 90 Degrees ——	10.00000
to S. of Stiles heighth 34 gr. 30′.	9.75577
So T. of hour-diſt. at the Pole 9° 36′.	9.22823
to T. of hour-ar. from Sub-ſt. 50° 30′.	8.98400

Again on the other ſide the Sub-ſtile.

Radis 90 Degrees ——	10.00000
to S. of the Stiles heighth 34 gr. 30′.	9.75577
So T. 5 gr. 24′. ——	8.97578
to T of hour of 2 from Sub-ſt. 3° 5′.	8.73155

After this manner may all the hour-arches be Calculated from either ſide the Sub-ſtile, by continual addition of 15 gr. each hours diſtance at the Pole, which transfer to the Plane by a Scale of Chords, and place the Gnomon directly over the Sub-ſtile.

CHAP. VI. FIG. VI.

The Calculation and Projection of an Erect South Plain declining East ward 81 Degrees.

BEcauſe I would not ſwerve from my Method in making this Dial, I have compoſed a way by Calculation, without having any reſpect to the Center; and I dare boldly ſay, as exact and expeditious a way as any extant, and the *Stile* may be proportioned to fill any Plane by the diſcretion of the Artiſt, the firſt thing to be found, is the diſtance of the *Subſtile* from the Meridian; ſecondly, the Elevation of the Pole above the Plane; and thirdly, the Plains difference of Longitude, commonly called the inclination of Meridians, the Calculation follows.

I. *For the Subſtiles Diſtance.*

As the Radius 90 Degrees————	10. 00000
to S of the Planes Declination 81 gr.	9. 99461
So C t of the Poles Elevation 52 gr. 40′.	9. 88236
to t of the Subſt. Diſt. à Merid. 37 gr.	9. 87697

II. *For the Stiles height.*

As the Radius 90 Degrees————	10. 00000
to C S of the Poles Elevation 52° 40′	9. 78279
So C S of the Planes Declination 81 gr.	9. 19433
to S of the Stiles height 5 gr. 27′——	8. 97712

III. *For the Planes difference of Longitude.*

As the Radius 90 Degrees————	10. 00000
to S of the Poles Elevation 52 gr. 40′	9. 90044
So C t of the Planes Declination 81 gr.	9. 19971
to C t of Inclin. of Merid. 82 gr. 49′	9. 10015

Theſe

These things being found, draw a Perpendicular line upon the Plane as A B, and with 60 Degrees from a Scale of Chords setting one foot in A, describe the Arch C D, then take in your Compasses 37 gr. the *Substiles* distance, and set it from C to R, and draw the line A R for the *Substile*; this done, take from the same Scale of Chords 5 gr. 27′ the *Stile* height, & set it from the *Substile* where it intersects the Circle as from R to S, and draw the line A S for the *Stile*, then consider the bigness of your Plane, so as you may augment the *Stile* that the hour lines may fill the Plane, which in this Example or Dial, we shall raise 9 Inches as the line E Z, which being drawn parallel to the line S O, and distant from it 9 Inches, so will the *Stile* be augmented; then make choice of two points in the *Substile* as at F and G, and draw the two contingent lines as M M and K K at right Angles with the *Substile*, then measure the height of your augmented *Stile* in both, the contingent lines from the *Substile* in Inches and Decimal parts, as from G to E, which I find to be 14 Inches, and from F to Z 11 Inches, which two numbers are to be made use of in the Calculation of the several hour distances: Next considering the Inclination of Meridians, was found 82 gr. 49′, therefore allowing for every hour 15 Degrees, being the Angle at the Pole, so that I find the *Substile* will fall between the hours of 6 and 7, for if I substract 82 gr. 49′ from 90 gr. (being 6 hours from the Meridian, for 6 times 15 is 90) the remainder is 7 gr 11′, for the distance of the 6 a Clock line from the *Substile*, being the Angle at the Pole for that hour, so likewise if I substract 75 gr. (the Angle at the Pole for the hour of 7) from 82 gr. 49′, the remainder is 7 gr. 49′ for the Angle at the Pole for the hour of 7; thus having these things, we shall proceed to the

Calculation of the ſeveral hour diſtances from the *Subſtile*, which are to be ſet off from the *Subſtile* in both the contingent lines, therefore two Arches muſt be Calculated for each hour by this Anologie. As the Radius to the Log. of the *Stiles* height in Inches (in either of the contingent lines) ſo the tangent of the Angle at the Pole, to the Log. in Inches and Parts, and ſo for the diſtance in Inches and Parts in the other contingent line for the ſame hour, as ſhall here be demonſtrated in the 6 a Clock line, being the firſt line on the upper ſide the *Subſtile*, whoſe Angle at the Pole was found 7 gr. 11'.

The Calculation in the Contingent K K.

As the Radius 90 Degrees———	10. 00000
to Log. of *Stiles* height 11 Inches——	1. 04139
So t of 7 gr. 11' Angle at the Pole——	9. 10048
to Log. $\frac{12}{100}$ Inch the hour Arch——	0. 14187

The Calculation in the Contingent M M.

As the Radius 90 Degrees———	10. 00000
to Log. of the *Stiles* height 14 Inches	1. 14612
So t of 7 gr. 11' Angle of the Pole——	9. 10048
to Log. of 1 $\frac{76}{100}$ Inches the hour Arch	0. 24660

By this Analogy may all the reſt of the hour lines be Calculated by a continual addition of 15 Dgerees for every hour; for if I add 15 gr. to 7 gr. 11' the ſum is 22 gr. 11' for the hour of 5 to be found by the ſame Analogy; again, 15 gr. added to 22 gr. 11' is 37 gr. 11', from which Calculation the hour of 4 is found, in the ſame manner muſt the hour lines on the other ſide the *Subſtile* be found, by uſing 7 gr. 49' the Angle at the Pole for the 7 a Clock line, which by the former Analogy will give the hour Arch for 7 a Clock, to which add 15 gr. and by the ſame proportion

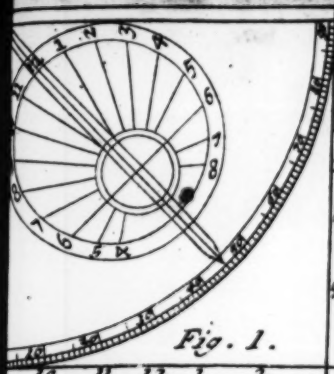

Fig. 1.

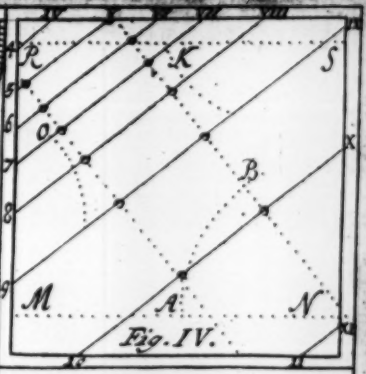

Fig. IV.

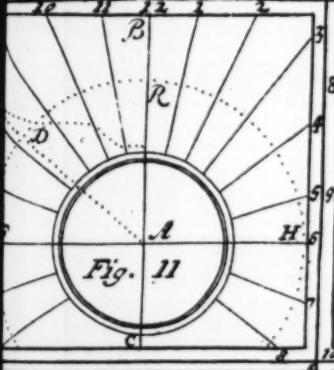

Fig. II

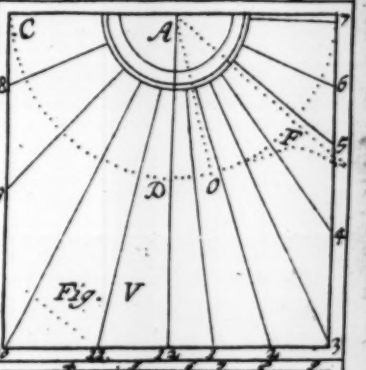

Fig. V

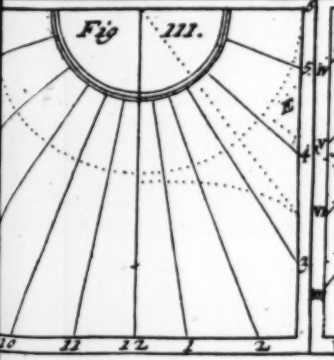

Fig III.

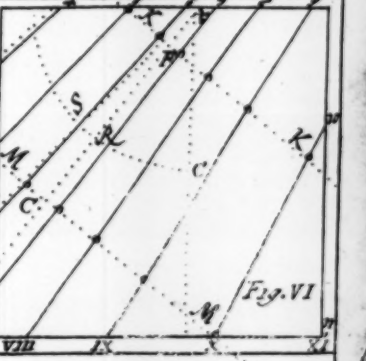

Fig. VI

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proportion find the hour Arch for 8, and ſo by the continual addition of 15 gr. uſed by the ſame Analogy may the reſt of the hour Arches be found, which may moſt eaſily be projected into the Dial from the ſeveral Calculations, by taking the hour Arches in Inches and Parts, and placing them from the *Subſtile* F and G upon their proper contingent lines, and there make marks, through which draw lines through the Plane, the *Gnomon* (or *Stile*) directly over the *Subſtile*, and the work is finiſhed.

Thus far and no farther (*when I firſt deſigned this work*) *did I intend to treat of this* Gnomonical Science, *but being at* Stamford *at the Houſe of my Honoured Friend Mr.* Gilbert Clerk's, *in* January 168$\frac{4}{5}$. *who had a little before Publiſhed his Ingenious Book of* Spot-Dialling, *I aſked his conſent* (*to whom I had firſt communicated my ſelf in this work*) *to re-print in my deſigned work, three of thoſe Sections printed in his* Spot-Dialling, *viz.* Spot-Dialling, Staff *and* Reflexive Dialling, *which for my incouragement, this Worthy Perſon freely condeſcended to, who indeed I always found willing and ready to do me any reaſonable kindneſs; it is now more than twenty years ſince I firſt ſate to learn, at the feet of this* Gamaliel, *who then inſtructed me in the grounds of Muſick, at which time I was very Solicitous to know, who was not wanting to inform my Judgment in ſo Dialectable a Study and Practiſe, and I do really wiſh I had more time allowed me to frequent the company of ſuch truly Ingenious Perſons; but I ſhall ſay no more, but recommend the three following Chapters to be uſed and peruſed by thoſe whoſe hands it ſhall come to, and are truly Friends to ſo Honorable a* Science.

CHAP. VI.

CHAP. VI.

The Deſcription and Making of the Spot-Dial.

THe *Spot-Dial* is of two ſorts, in the one the lines go to a black ſpot, in the other a bright ſpot goes to the hour lines, which latter being explained, the former cannot be unknown.

The Materials are Tin, a Frame and Glaſs.

I buy a ſheet of Tin of the Iron-Monger for 5 *d.* which will ſerve many Dials.

And for ordinary Friends, the Frame of Wood will not coſt much more, I get the Carpenter to ſhoot two Rulers of Fir-Deal, one having five ſurfaces, much like a ledge of a Book-Desk, out of this I cut one longer piece, about ſix or ſeven inches long, as occaſion ſerves, for the top piece, the loweſt and broadeſt Superfices whereof, to be about one inch and a quarter.

I cut alſo two ſhorter pieces for Jaumes or ſide-pieces, each about 2 inches and $\frac{1}{4}$ long, and making Rappits in them with a Saw, (or otherwiſe) for the ends of the Glaſs to go into, and ſo as the Glaſs may be one inch (or thereabouts) diſtant from the outwardmoſt edge, or Tin, I nail the top piece on the Jaums with long Tacks without heads, which will be ſtrong enough, when the Plate of Tin is nailed with little Tacks upon the back-ſide of the Frame.

Then with other long Tacks, I nail the bottom piece to the bottom of the Jaums, and I bore the holes for theſe Tacks with an Awl ſo deep, as that it may be taken off at any time with my Knife, without much difficulty; I cut this bottom piece out of the

other

other Ruler, which therefore is flat and ſomewhat wider, that the Frame may inſiſt the better upon it as a Baſis.

But for my extraordinary Friends, I get the Joyner to make moulded Frames with Miter Joynts, like the Frame of an Ebony Looking-Glaſs; and ſuch curious Frames as are made for Pictures, Gilt, of Ebony or Ivory, with little Globes and Piramids at the top, might be made as would be ornamental, and would become the beſt Ladies Cloſet in the Land. The other Material is Glaſs; I did at firſt uſe Paper, which will repreſent the Spot very well, but was apt to crumple and crook the lines, and in ſome windows to grow odiouſly foul in a little time, then I procured a plain thick Horn, which would ſhew the Spots in the clear parts, but it had too many black and dark patches in it; after many trials of gumming Paper and Sarſenet upon Glaſſes, which for one fault or other I liked not, I procured an nealed Glaſs from *London*, which did very well; I did alſo with *Chalice* Sand grind Criſtal Glaſs, and other common Glaſſes, upon an Iron Plate, or the Chryſtal Glaſſes one upon another, which in repreſenting the Spot were not much inferior to anneal'd Glaſs; but which I liked better, becauſe I could procure them with leſs trouble, and they having this conveniency, that if make any fault, I can quickly grind it out, and begin again. I would for curioſity's ſake have tried Ivory Plates, or thin Plates of ſuch Bone as they make Bone Combs of, but I failed in procuring them, and was not eager, being ſo well ſatisfied with the former Glaſſes: beſides I doubted whether that matter would ſo well endure the violence of the Summer Sun.

I had very fine Lanthorn Horns ſent me, but they would not ſerve; firſt, becauſe they were buckled, and

and then becauſe they were ſo thin as to be tranſparent, for it is eſſential to my purpoſe, that the matter ſhould be lucid as Paper, but not ſo tranſparent that any thing may be ſeen through it, for the light will penetrate ſuch Glaſſes, and not terminate in them, for which reaſon I found my ſelf deceived, when I thought that red, blue, or other colored Glaſſes would effect what I deſigned, except they were alſo ground: At laſt I happened upon Materials which did throughly pleaſe me, and were cheap enough, for that was a main thing which I deſign in theſe Dials: But in grinding Glaſſes you muſt have a great care not to grind the other ſide, for in a little time you may ſo ſmutch the Glaſs by heedleſs miſtakes, as to make it uſeleſs.

You can hardly break Chryſtal Glaſſes, but common Glaſs will ever and anon break, by ſome greater grit in the Sand, or leaning too hard, or by reaſon of ſome crookedneſs in the Glaſs; therefore chuſe as plain and even Glaſſes as you can, yet the broken pieces may often ſerve for North Dials.

Of taking the Declination.

For the making of the Dial, firſt, find the Declination of the Glaſs-window, againſt which you would ſet your Dial, which is eaſily done by a true Meridian; for having with a Plumb-line Pen and Ink, drawn a black line upon the Quary perpendicular to the Plane of the Horizon, when the Sun is in the Meridian, apply a little quadrant Plate or Card horozontally to the Quarry, and mark the Angles, which the ſhadow of the black line maketh with that edge of the Card which is next the Glaſs, for the complement of that Angle being taken off by a line of Chords, or otherwiſe, is the Declination.

Of

Of making the Dial first upon Paper.

After you have the Declination, make a Dial upon Paper to that Declination, with *Stile* and *Subſtile* down upon the Paper, as if you were to make it for the Wall without doors, or out-ſide of the Window.

Of the Glaſs firſt in the Frame.

Next put your Glaſs already ground, into the Frame, and take the neareſt diſtance between your Glaſs and the Tin, or that ſide where the Tin is to be nailed; for this end make a Square of Paper, and applying one ſide to the Glaſs now in the Frame, make a point at the neareſt diſtance, and clip off the reſt of the Paper at that point; with that diſtance come to the Dial on the Paper, and lay the longeſt edge of this Square to the *Sub-ſtile*, and carry it backward or forward upon the *Sub-ſtile*, till the marked point juſt toucheth the *Stile*; then holding it, draw a line from the *Sub-ſtile* to the *Stile*, and mark that point upon the Paper where this line cutteth the *Sub-ſtile*, *viz.* at the corner of the Square, which I call the *Sub-ſtile* point, and draw a round ⊙ about it, that I may know it again.

Of the Glaſs firſt taken out of the Frame.

Then take your Glaſs out of the Frame, and apply it to the Dial upon the Paper, laying the anneal-ed Surface of the Glaſs uppermoſt, ſo as the very edge of the Glaſs may touch or juſt cover the *Sub-ſtile* point, and the other edge at the end which muſt go into the Rappit, may lie parallel to the Meridian upon the Paper as near as you can gueſs (which is ſufficient) then remove the Glaſs toward the right hand, or toward the left till it lies upon thoſe hours which will ſerve your turn beſt.

But *Note*, That if the Meridian be not under your Glaſs as it now lies upon the Paper, you muſt inſtead of it uſe a parallel to the Meridian, drawn firſt upon the Original, *i. e.* the Paper, and caſt it ſo as that the perpendicular upon the Glaſs to be made with a Plumb-line correſpondent to the parallel, may fall as near one of the Jaums; which will not be hard to do.

For ſo, this correſpondent perpendicular on the one ſide, may direct for even placing the figures on that ſide, then (that I may digreſs a little) draw with your Pointer a like line on the other ſide, and another at convenient diſtance from the bottom of the Glaſs, for the figures, which if you write upon the rough ſide (as you will find needfull to do) muſt be made invented, that is, for the nine you muſt write eleven, if you write in Roman letters, which you muſt heed carefully; and therefore your beſt way is to have a Copy before you of figures drawn wrong, and then you will find them to be right when all is put together.

Note alſo, that if the Declination be Weſtward, the back-ſide of the Dial will ſerve for the ſame Declination Eaſtward. *Et contra.* And by vertical Inverſion they will both ſerve for the like Declinations from the North, and every one muſt be invented or invented for that ſort of Dials in which the lines go to Spot. But to return,

When you ſee which hours will ſerve your turn beſt before you draw the lines upon it, mark upon the Glaſs alſo the *Sub-ſtile* point, and likewiſe the point where the edge of the Glaſs cuts the Meridian or Parallel aforeſaid.

Of the Glaſs in the Frame the ſecond time.

Then put the Glaſs into the Frame again, and from that point made againſt the Meridian or Paral-

lel

lel, or if you cannot well ſee it, from another as you can gueſs perpendicularly under it, let fall a perpendicular by a Plumb-line, or make marks.

Of the Glaſs taken out of the Frame the ſecond time.

Then taking your Glaſs out of the Frame, draw that perpendicular upon the rough ſide of the Glaſs, with a Poynter, ſuch as the Glaziers uſe, or a Diamond ſpark in a Pencil, ſuch as are ſold at *London*, to write upon Glaſs; or if you want theſe, with the ſharp point of your Pen-knife or of a Nail upon annealed Glaſs, and after draw your Pen over it once, and again (if need be) with good black Ink, next apply this new Meridian upon your Glaſs, to the Meridian upon the Paper Dial. and becauſe you may have guſſed, as I ſaid, if the *Sub-ſtile* point in your Glaſs do not lie juſt over that in the Paper Dial, blot it out, and make another that will.

Of drawing the Hour lines.

Now as your Glaſs lies upon the Paper as is directed, if it be common thin Glaſs, keeping it ſteady upon the Paper with your own Hand, or ſome Friends help, draw the Hour lines, tranſplanting them from the Paper to the Glaſs, as afore, with a Diamond if it may be, *&c.* but if it be thick Chryſtal Glaſs, tranſplant them firſt upon Paper, of almoſt the bigneſs of the Cryſtal, and laying this leſſer Paper upon the Cryſtal, make marks by which to draw the Hour lines upon the Cryſtal, as you ſhould have done if it had been thinner Glaſs, and upon the Dial Paper.

Of the Tin.

Laſtly, nail your Tin on the back-ſide of the Frame, covering the better half of it, and in that

Tin make the hole perpendicularly over againſt the *Sub-ſtile* point, which you will find by the Paper Square, by which you may draw a perpendicular line from the *Sub-ſtile* point, and Ink it upon the top piece, *i.e.* upon the broadeſt Superficies or bettom of that.

Make the hole with an Awl, laying it upon ſome hard board, leſt the Awl run in too far, and make the hole too big, rather thruſt no harder than will make a diſcernable pimple on the out ſide of the Tin, to be cut off with your Knife, you may more eaſily make the hole bigger than leſs. I make the hole ſo near the top, becauſe all above that is uſeleſs. and the perpendicularity is more certainly found, by the Square, and which if it be miſtaken, cauſeth the greateſt error.

The greateſt hazard being in making the hole right, when you know very near where it is to be, you may make the hole in the Tin firſt, and ſetting your Frame in the Window, if you be ſure of the Declination of it, mark by your Meridian where the Spot is made at twelve a Clock, and then with the help of a Plumb-line having drawn a true Meridian upon your Glaſs, proceed by the directions given, to ſet on the reſt of the lines, this way is not very practicable.

Note laſtly, That your Glaſs muſt have a proportionable length and breadth; in breadth for the Meridian Altitude of the Sun in *Cancer*, for the Spot will go down very low in Summer, but it will never go down twice the profundity or depth, *viz.* the diſtance between the Glaſs and the Tin, or neareſt diſtance.

By the breadth, I mean the neareſt diſtance between the top piece and the bottom piece, but as near as I could meaſure according to this following Table,

Table, ſuppoſing the Sun's greateſt Meridian Altitude to be 62 Degrees, but remember that allowance muſt be made at bottom, for writing the figures.

Depth	Breadth
½ Inch	1 5/6
¾	1 1/3
1	1 3/6
1 ½	2 11/16
2	3 10/16
2 ½	4 ½
3	5 ½

Depth.	
½ Inch	1 ⅔
1	5 ½
1 ½	8 ½
2	10 ½

For the length of the Frame and Glaſs that muſt be, as the Jaum of the Window and Stanchel will give leave, but if it be not long enough, or as the hole may fall out, the Spot may fall upon the oppoſite ſide of the Frame, and ſo an hour or more may be loſt, but for the moſt part the length will be about the proportion of the ſecond Table, *viz.* one inch in depth will have 5 ½ in length. You need not make any hole in the Window Glaſs, for except the Glaſs be very foul, the light will come through it well enough, if the Lead do not obſtruct it.

Now I need not ſay much of that Form, wherein the lines go to the Spot, for it is but the ſame inverted, as if you ſhould turn this upſide down, and draw the lines toward the Window or Street, upon a clear tranſparent Glaſs, and on the inſide toward the Houſe inſtead of Tin, you have annealed Glaſs, with one black Spot at the bottom, where the hole is in the Tin, unto which Spot every line will come ſucceſſively, according to the time of the day, and the figures muſt be written upon the clear Glaſs at top; but I make the leaſt uſe of this, becauſe it is hard to make handſome and durable Letters or Figures upon

ſmooth

ſmooth Glaſs (poſſible a Glazier might do it with his Pointer) and there muſt be a great ſquare Glaſs behind it (which is not uſual or troubleſome to have) or elſe the Lead will make a very unhandſome confuſion: Beſides, it doth not altogether repreſent ſo well by a faint light, as the Sun Beams will gild the Glaſs through the hole, otherwiſe it hath more of prettineſs and conceit in it; for when the Sun doth not ſhine, a Stranger would little think that was a Dial, ſeeing nothing but a little black *Spot*, and very likely not that neither.

CHAP. VII.

To make a Staff-Dial.

DRaw a line upon Paper as long as will go twice about your Staff; upon that line as a Diameter make a Semi-circle, from the equal diviſions of that Semi-circle, let Perpendiculars fall upon the Diameter, as they uſe to making a line of Signs.

The firſt point in this line of Signs ſhall be for the Sun in the firſt degree of *Capricorn*, and in the firſt of the next thirty degrees for the Sun, in the firſt degree of *Aquarius*, *&c.* according to the order of the Signs. And it is ſufficient if 30 be divided but into three parts; which in the firſt and laſt thirty can hardly be done, nor is there need.

This line of Signs, muſt be ſet Horozontally upon the top of the Staff, round about it as ſhall be ſhewed: But from the Solſtitial and Æquinoctial Points (and from others as the 10th of *Taurus*, or the 10th of *Gemini*, when there is need) Perpendiculars ſhould be drawn down the Staff, but for the more

more practicable Deſcription of the Dial, repreſentative Perpendiculars ſhall be drawn upon the Paper, which ſhall be as Tangents whoſe Radius ſhall be the *Stile*, which muſt inſiſt perpendicularly upon the Staff, and line of Signs.

The Meridian Altitude of the Sun in the *Solſtitial* and Æquinoctial points, muſt be computed and noted in the Tangents upon the Paper, and through the noted points let a circle be deſcribed upon the Paper, as *Euclid* hath taught to draw one through any three points, for the hour of 12, and in like manner for the reſt of the hours. For which therefore you muſt Calculate a Table of Altitudes, according to the Elevation of the Pole, *viz.* for every hour, Mr. *Wingate's* Analogies, as in theſe *Examples*; ſee alſo *Foſe*, p. 50. where he giveth Tables for 50 and 52.

For 52 Degrees 25'.

Hours.	♋		♎		♑		10 ♉		10 ♊	
12		61 5	37	35	14	5				
11	1	58 54	36	6	12	58				
10	2	53 10	31	53	9	51				
9	3	45 22	25	33	4	34				
8	4	36 34	17	45			29	51		
7	5	27 17	9	5			21	48		
	6	18 25	0	0			11	42		
5	7	9 52					2	53	8	0
8	4	2 13					♋		10	0

At

At *Stamford* the Pole is Elevated 52° 40′ or according to Mr. *Vincent Wing*, 52° 41′.

12		60	50	37	20	13	50				
11	1	58	40	35	5	12	43				
10	2	52	59	31	4	19	29				
9	3	45	15	25	2	44	22				
8	4	36	31	17	38			29	46		
7	5	27	20	9	2			20	40		
6		18	21	0	0			11	38		
5	7	9	50					20	50	8	0
8	4	2	10					0	00		0

Lastly, One half of the line of Signs being like the other, let half of it be applied to your Staff or Cilinder, and reflect the other half.

But Note, That either the *Stile* or the Cilinder must be movable, so that the *Stile* the 10th of *December* may be over the first point of the line of *Signs*, and the 10th of *January* over the first point of the next 30, and the 10th of *March* over the last point, . then you must go back, and so backward and forward through the whole year.

If you do not understand what I have said, especially about the 10th of *Taurus*, (for you must have three points to describe every hour-line. *See Fole's* Quadrant, Chap. 28.

The chiefest trouble about this Dial, is in making either the Radius or the Plate upon which the lines are drawn, movable.

But if the aforesaid Perpendiculars, supposed to be drawn down the *Staff*, be indeed lightly expressed, and likewise a competent number of Parallels to the line of *Signs*, all might be fix'd, setting the Radius in the midst of that line; for by the help of those Parallels and turning the Staff a little, if needful, the

the Eye would presently discern where the shadow would fall: Some, when they are abroad, use a Ring Dial, but that is not so ready at hand as this, and besides we cannot make it our selves, and therefore I forbear to describe the making of it.

CHAP. VIII.

The making a Cealing or Reflective Dial.

FIrst, determine the most convenient Point in the Window, where to place the Reflecting Glass, as near the Ceiling as you can conveniently, provided it be not so near as that the Cornish of the Window will shadow the Glass when the Sun is high in Summer, suppose within about 10 or 11 inches of the Ceiling, at least of that Ceiling which belongs to the Window it self, then from that point draw by the helps aforesaid, a Meridian upon a plane Horizontally placed against the determined point in the Window, and to that Meridian finish an Horizontal Dial, but instead of a *Stile* to rise above the Plane, let it fall as much under the Plane, *viz.* according to the Elevation of the Pole, and in the Plane of the Meridian; then by the help of a thred find where that *Stile* would cut the Floor, or any other place, if it was produced; and drive a Nail into it, with a thred long enough to be extended to any part of the Ceiling.

Fasten also another long thred to the Center of the Horizontal Dial, and desire one of your Friends to extend it Horizontally, as the Plane will direct, and exactly over every Hour line in order, whilst you in the mean time extend the thred which was fastened

to the Nail in the *Stile*, to the Ceiling, but ſo as it may touch the other Horizontal thred. Mark that point in the Ceiling which the extended thred toucheth, and make more ſuch marks whereby to draw the Hour line upon the Ceiling, and do in like manner for the reſt.

Laſtly, Take all away, and place your Glaſs Horizontally, and becauſe your Glaſs hath a Latitude, place it a little under the determined point, that the Center of the Glaſs may be juſt in the imaginary Axis which goes to the Nail, for whereſoever you place it, in that it will go true.

But becauſe it may be troubleſome to place an Horizontal Dial faſt enough and exactly, and there is ſome hazard in finding exactly the point where the Nail is to be driven, I will ſhew you another method which may be more eaſily practiſed.

Firſt, draw an Horizontal Dial upon the back of ſome Table, or ſome Plaiſter Wall or Floor.

Next, draw a Meridian upon the Bay board by a thred or perpendicular black line, as hath been ſaid, paſſing through the point where you intend your Reflecting Glaſs ſhall be, and by a Plumb line tranſlate it from the Bay-board to the Ceiling.

Take the neareſt diſtance between the Glaſs and the Ceiling exactly.

With this diſtance come to your Dial on the Wall, and ſet one end of it on that part of the Axis where the other will juſt touch the Meridian. That point in the Axis may be called the Glaſs point, from which erect a perpendicular, and where it cuts the Meridian, make a point, which will be the Æquinoctial point, from which alſo erect a perpendicular, which will be a Tangent, then at ſome diſtance on which ſide of the Æquinoctial point you find moſt convenient, erect another Tangent; theſe two Tangents will cut the

the Hour lines in points, which may be called the Hour points.

Then take the diſtance betwixt the Glaſs point and the Æquinoctial point, and extend it from the Glaſs toward the Meridian and where it toucheth, that is the Æquinoctial point upon the Ceiling.

Laſtly, Set off correſpondent Tangent lines upon the Ceiling, and making like Hour points, through thoſe points draw the Hour lines, you need not blot out the Æquinoctial Tangent, it being pleaſant to ſee how the Sun will go in that line all day, when it is in the Æquinoctial. Beſides the Æquinoctial point will tell you on that day whether your Glaſs lie Horizontally, which is a hard matter by Inſtruments to find: or upon any day you may Calculate the Suns Meridian Altitude, and ſee whether it falls juſt upon that point in the Meridian at twelve a Clock.

This Dial is nothing but an Horizontal invented, the Center whereof is in the Tin without, except you make a North Dial, which is ſeldom done, and then it will be upon the Ceiling, which you muſt find by its diſtance from the Æquinoctial point, and let that Center govern your Tangents. The ground of this Dial is, that the Angles of Reflection are equal to the Angles of Incidence.

Sometimes inſtead of two Tangents you may uſe two Circles, eſpecially when the Center of the Dial is upon the Ceiling, or when your Glaſs is near the Window Ceiling, then the Æquinoctial point will be upon that Ceiling, und you may project the Hour lines upon the Chamber Ceiling, or the Walls, by one thred extended over the Hour line, and another thred touching that and extended from the Æquinoctial point, or any point in the imaginary Axis to the Ceiling or Wall.

You may draw the lines with Charcoal, or red Oker, and rub them with your finger.

Let your Dial upon the Wall be drawn very true and fine, and remain to take diſtances for uſes at any other time.

I was once deſired to conſider how to make a Dial upon a Cylinder or Pillar of an Houſe, which is eaſily done by a convenient Plane of board or Paſt-board, cutting out (almoſt, or quite) much the greateſt part of it, leaving but a Limb ſufficient for ſtrength, and ſome parts of the Hour lines: if it be over Paſt-board you may put fair Paper, with Water made of the Infuſion (or boyling) of Gum-Araback, or Gum Tragacanth, or even tempered thin with Wheat Flower; then faſten the Plane to the Cylinder, which it will touch in a perpendicular line, and to what Declination you think moſt convenient, make a declining Dial and fix the *Stile* upon it, then cutting the aforeſaid part quite off, by a Candle or your Eye ſee where the *Stile* through every hour directs upon the Cylinder, and ſet the Axis in that point of the Cyllinder, which it would enter, if it was produced. By the like like means you may project as many Dials as you pleaſe, upon a great Globe or two Free-ſtone Hemipheres, or upon a Cane, or what you pleaſe.

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APPENDIX

To the Preceding

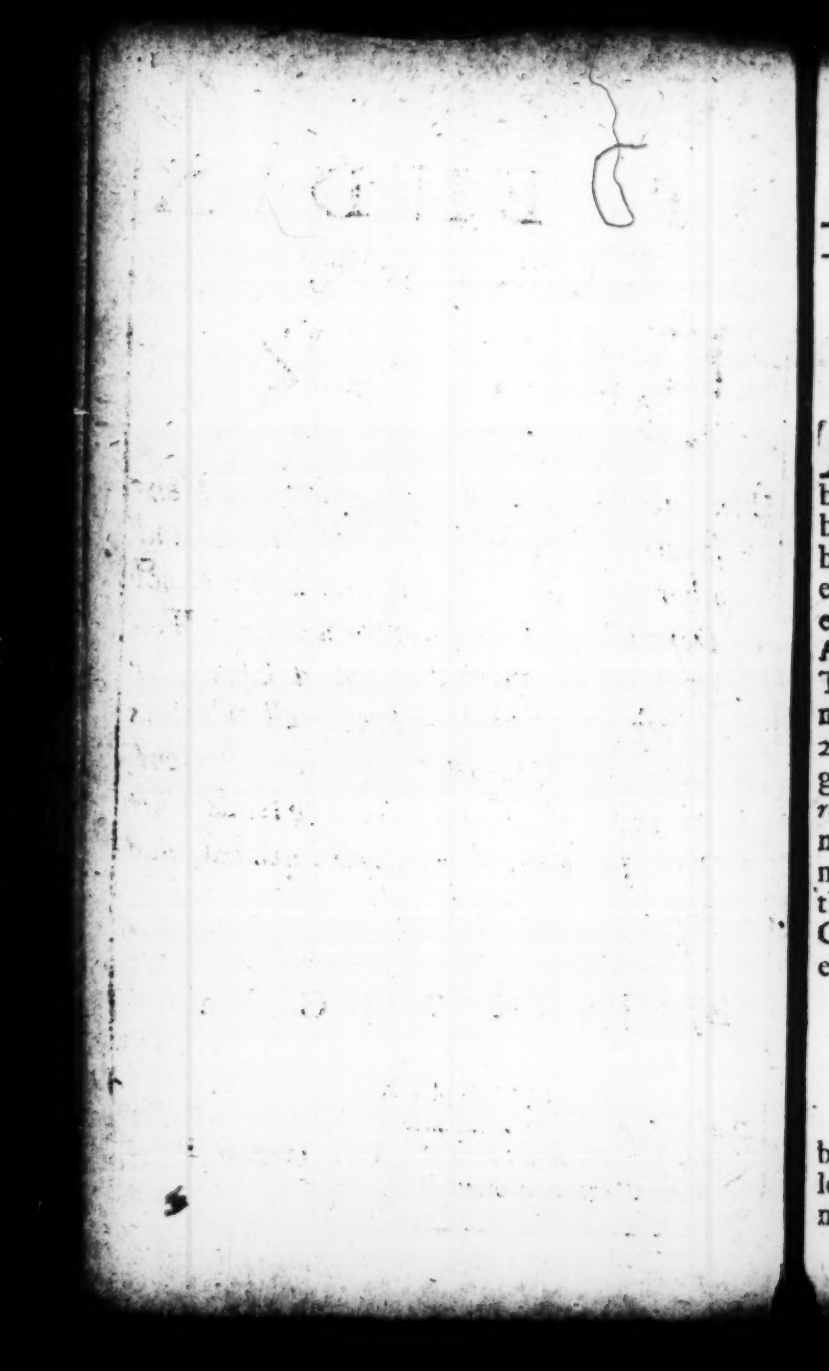
BOOK,

Wherein is ſhewed the Deſcription and Menſuration of ſome Conical Sections, *and other ſuch like* Solids, *with an exact Deſcription how to know whether Water may be convey'd from a* Spring *or* River, *to a place deſired, all which is very uſeful to ſuch ingenious Perſons, whoſe Genious and Practiſe tends that way, for whoſe ſake it was intended, and now made publick.*

By JOHN WING Math.

Apocalypſis XI. I.

Datus eſt autem mihi calamus ſimilis virgæ, aſſititque Angelus, dicens; Surge & metire Templum Dei & Altare & eos qui adorant in eo.



The Deſcription and Menſuration of a Spheroid.

A *Spheroid*, *Elliptical Conoid*, or long *Sphere*, is made by the Revolution of a Semi-Ellipſis about its Tranſverſe Diameter, whoſe content is found by multiplying the Aare of the conjugate Diameter by $\frac{2}{3}$ of the Tranſverſe Diameter for the Content of every *Spheroid* $= \frac{2}{3}$ of a Cylinder, whoſe Baſe is equall to the greateſt Circle of the *Spheroid*, and the Axis both the ſame. Thus if a *Spheroid* whoſe Tranſverſe Diameter is 30, and the Conjugate Diameter 14, whoſe Aare is 154, being multiplied by 20 being $\frac{2}{3}$ of 30, the Axe or Tranſverſe Diameter gives 3080 for the Solid Content of the ſaid *Spheroid* being exactly $\frac{2}{3}$ of a Cylinder of the ſame Diameter and Axe, as for example, the Aare of the Diameter 154 multiplied into 40 the whole length of the Cylinder, gives 4620, the Solid Content of the Cylinder, from which taking 1540 being $\frac{1}{3}$, leaveth 3080 the *Spheroid* Solidity as before.

By Logarithms.

154, 1.18752 + 20, 1.30102, = 3080, 3.48854.

If the Solid Content of the Fruſtrum of a *Spheroid* be required to be found, that is cut by a plain Parallel to the Plane of the Conjugate Diameter, it is but multiplying the Aare of the Baſe cut off, by $\frac{2}{9}$ of the Fruſtums

Fruſtums Altitude, and the product quotes the Fruſtums Solid Content.

It is a great piece of practiſe (as well as Art) in Gauging, to know what a Veſſel in this form will hold upon every inch deep, which is call'd inching of a *Spheroid*, and 'tis thus performed; take the Diameters of every inch, from the Conjugate Diameter each Diameter being ſquared, that is multiplied in it ſelf; which ſquare number being added to the double ſquare of the Conjugate Diameter, that ſum divided by 1077 quotes the content in Ale Gallons upon the firſt inch deep, by which method the reſt may be all found.

The Deſcription and Menſuration of a Parabola, Paralolick Canoid, *and its Fruſtums.*

A *Parabola* is a *Conick Section*, and will be beſt underſtood by deſcribing the Plane it is cut by from the Cone. which is thus. From the bottom of a Cone parallel to one of its ſides, being ſo cut off, whoſe Plane produceth a crooked Section. which is the Plane of a *Parabola*, and its proportion to a *Parallelogram*, is as 2 to 3, or $\frac{2}{3}$ of a *Parallelogram* of the ſame Baſe and Height, ſo that the Solid Content is found by multiplying the Aare of the Baſe by $\frac{2}{3}$ of the height, and a Triangle touching the extream point is $\frac{1}{4}$ of a *Parabola*.

A *Parabolick Conoid* is made by the turning about of the *Semi-Parabola* upon its own Axis, and contains $\frac{1}{2}$ of a circumſcribed *Cylinder*, ſo that its ſolid content is got by multiplying the Aare of the Baſe by $\frac{1}{2}$ of its Altitude.

The ſolid content of the Fruſtums of a *Parabolick Conoid*, is found by adding the Aare of the greater and leſſer Baſes together, and their ſum multiplied by $\frac{1}{2}$ of the Altitude, quotes the Solidity. Other-

Otherways, find the Aare of the middle, which multiplied into the depth, produceth the ſame.

The Deſcription and Menſuration of a Priſmoid *and* Cylindroid.

A *Priſmoid* is a Solid which may be contained under ſeveral Planes, whoſe Baſes are always parallel though they may be diſproportional, which may be contained Rectangular Parallelograms, *&c.* the ſides being ſtraight, ſo that ſtraight lines may be applied from top to bottom; this underſtood, it matters not whether the Baſes be alike or unlike, proportional or diſproportional. This general Rule finds the ſolid content.

I. Add $\frac{1}{2}$ of the leſſer length to the greater length, and multiplying that ſum by the greater breadth, reſerving that product.

II. Add $\frac{1}{2}$ of the greater lengeh to the leſſer length, and multiply that ſum by the leſſer breadth, this product add to the former.

III. The ſum of theſe two products multiplied by $\frac{1}{3}$ of the *Priſmoids* depth, the product quotes the ſolidity.

By the ſame Rule may a content ſolid of a *Cylindroid* be found, the Baſes both Elliptical, unequal, and diſproportional, the Figure being in all reſpects elſe the ſame.

I have added thus much by way of *Appendix*, to whet the fanſie of the Ingenious *Tyro*, which well conſidered and underſtood, may eaſily conduct him into the more miſterious and abſtruce parts of this Science. I ſhall conclude this *Appendix* with one uſeful thing, *viz.*

How to know whether Water can be brought from a Spring or River to a determinate place.

All Authors (I have yet met with) tells us that if they find a poſſibility of conveying Water from a Spring or River to a determinate place, that in caſe of too violent a motion of the Water, by reaſon of the ground ſuddenly falling and riſing, they do adviſe to make Trunks of Wood or Lead well underpropt, to give the Water its proportional deſcent, which I think to be a needleſs curioſity, for the Water will riſe equal to its level, though the Pipes lie according to the irregularity of the ground, with this caution, *viz.* that the Pipes conveying the Water diminiſh equally to the riſe of the Hill, $\frac{1}{2}$ of an inch will do it in the hallow of the Pipe, ſo that if the riſe of the Hill be near equal in length and height to the fall, in reſpect the greater weight of Water lieth behind, it will force its way near its level, and when the Water is ſo drawn over the Hill, you may give liberty again at pleaſure; and though there be never ſo many Hills and Dales in its way to the place appointed, by obſerving this Rule may Water be conveyed, this conſidered, our buſineſs is to know whether Water may be brought from a Spring to a place deſired, which is thus to be known; Provide a Water level made for that purpoſe, and alſo two Station Staves divided from the bottom to the top into feet, inches, and tenth parts, and likewiſe two Men to perform the Office of theſe two Staves, which call the firſt and ſecond Aſſiſtant, then having a ſheet of white Paper to move up and down each Station Staff as occaſion ſhall require; being thus provided, repair to the Spring or River and proceed thus, place your Water level at a convenient diſtance from the Spring-

Springhead, & in a right line towards the place which the Water is to be carried to, as 20, 30, 40, 50, 60, 70, or 100 yards, the greater the distance the better, then cause your first Assistant with one of the Station Staves, to set it upright at the Spring head, whose bottom shall be equal to the top of the Water, then cause your second Assistant to set up the other Station Staff in a direct line forwards, and at the same distance from the Water level, *viz.* towards the place where the Water is to be carried; your Staves being thus perpendicularly erected, and the Water level in the mid-way betwixt them, being set exactly Horizontally, then repair to the end of your Water level, and looking through the sights, to the first Assistants Station Staff at the Spring head, causing him to move a leafe of white Paper up and down the Station Staff, till you just espy the edge thereof, and cause it there to rest by some known sign or sound, and let him carefully note what feet, inches, and parts the edge of the Paper makes with the Staff, and write it down, your Water level remaining in its same posture, repair to the other end, and looking through the sights to your second Assistants Station Staff, cause him also to move a leafe of Paper, till you shall just espy through the sights, the very edge of it, and cause it to rest there, he carefully noting the parts of the Staff cut by the edge of the Paper, and writing it carefully down also, when this is done, cause your first Assistant to bring his Station Staff from the Spring head, and set it directly in the place where your second Assistant with his Station Staff stood, and cause him your second Assistant with his Station Staff to go directly towards the place to which the Water is to be conveyed, 40 60, 80, 100, or 200 yards, and there to set it perpendicular as be-

fore, then again place your Water level exactly Horizontally, and in the mid-way betwixt them, making the ſame obſervation in this ſecond Station as you did at your firſt, and as often as you have occaſion to move, obſerve this method carefully, and you cannot err, and when you have thus drawn to the place to which the Water is to be conveyed, compare the Notes of your two Aſſiſtants together, and if you find the ſum of your ſecond Aſſiſtants Notes to exceed the ſum of your firſt Aſſiſtants Note, then you may conclude the Water may be brought to the place deſired, as in this Example.

The 1ſt Aſſiſtants Note.

Sta.	Feet	Inch.	Parts
1	13	7	8
2	4	3	2
3	0	10	7
4	1	5	5
5	5	11	2
6	3	2	1
7	0	6	4
ſum	29	10	9

The 2d Aſſiſtants Note.

Sta.	Feet	Inch.	Parts
1	7	2	9
2	10	10	7
3	5	7	3
4	2	0	8
5	1	8	7
6	4	5	6
7	0	2	1
ſum	32	1	8

Thus by collecting each Aſſiſtants Notes at his ſeveral Stations, and added as in this Table, it clearly appears that the Water may be brought down to the appointed place, ſince the ſum of the ſecond Aſſiſtants Note is greater than the firſt by two foot, two inches, $\frac{2}{10}$ of an inch, but had the ſum of the firſt Aſſiſtants Note exceeded the ſum of the ſecond

Aſſiſtans

Aſſiſtants Note, there could have been no ſuch thing as conveying the Water to that place; obſerve alſo that for the Current of the Water, there ought to be allowed at every mile end ſix inches, ſome Authors ſaith 4 ½ inches at the end of each mile deſcent will do; obſerve farther, that 'tis better to bring the Water by a crooked, than a ſtraight line, and eſpecially where the deſcent of the Water is great, it will prevent its having too violent a motion in its way.

FINIS.

Courteous Reader,

BY reaſon of the Author's great diſtance from the Preſs, there may be ſome very few Typographical eſcapes, and miſpointings, &c. *which you are deſired to mend with your Pen as you read. The Printer is ſure that many there cannot be, and ſcarce any material.*

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